# ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

cGraw-Hill Co.
of California

MARCH, 1942

25c a Copy

# KEEP 'EM WORKING

★ The electric appliances your good customers bought from you last year—and in the years before—are more valuable than ever. For many of them can't be replaced today. Many will have to last for "the duration". ★ See that they stay in service. That's a good job for these days of shortages and rationing. It's an emergency job for which you, as electrical dealers, are particularly well equipped to handle. Why not get busy at it now?

SOUTHERN CALIFORNIA

ALL-WINTER SUN FESTIVAL

SOUTHERN CALIFORNIA Edison EDISON COMPANY LTD.



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New, Improved
PHOTOELECTRIC
WATTHOUR-METER TESTER
for easy, low-cost testing
IMPROVEMENTS
1. Entirely new electric circuit—so arranged that the equipment responds to rate of change in light intensity, and is not affected by normal room illumination or any amount of stray light falling on the photocell.
2. No adjustments—grid-bias adjustment eliminated.
3. Two separate revolution selectors—one for light load, the other for full load.
4. Transfer switch—for changing from one revolution selector to the other.
5. Built-in LIGHT-DARK switch—so meters can be tested by shining light through the anticreep holes of the meter disk or by reflecting light from the edge of the disk.

### *How It Works*

THIS automatic equipment for testing watthour meters makes use of the "electric eye." A light beam and relays count the revolutions of the meter under test, and start and stop the rotating standard.

### *Advantages of Photoelectric Testing*

This method of testing provides two fundamental advantages—improved accuracy and saving in time—which reduce the cost of testing.

The timing error is negligible; hence, long runs are unnecessary. This permits a 50-per-cent reduction in running time as compared with the running time of the old hand-switch methods, where the timing accuracy is dependent on the operator's skill.

Additional savings can frequently be made by planning the entire test procedure. How this can be done, how to test meters that do not have anti-creep holes in the disk, how the equipment can be put to many other uses—all this is explained in Bulletin GEA-3348. Ask the nearest G-E office for a copy.

Let this tester save time that is so essential now when experienced operators are going into the services or are being transferred to other jobs. *General Electric, Schenectady, N. Y.*

*General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.*

GENERAL ELECTRIC

601-11-6110

# Here in the WEST

## People

**N. H. Boynton**

who is Western sales manager of General Electric's Lamp Department, is a Minnesotan, born in 1885. As a young electrical engineer just out of the University of Illinois, he went to work in 1909 for the National Electric Lamp Assn. at Cleveland. Each successive change in that organization brought him new responsibilities until he took over his present post in 1931.

**C. N. Teed**

co-author of the lightning protection article, was born in Meridian, Idaho, in 1904. After graduation from high school, he enrolled in electrical engineering at the University of Idaho. Force of circumstances which necessitated his going to work for Idaho Power as a file clerk, draftsman and blueprinter in the general office engineering department, did not deter him from finishing his technical education by correspondence. He won a B.S. degree (E.E.) from Idaho in 1931. After a spell as substation designer, he worked at the Bremerton Navy Yard on leave, then returned to Idaho Power as assistant distribution inspector. Since 1938 he has been engineer in the distribution department charged with responsibility for voltage regulation and operation improvement.

**J. F. Servis**

who jointly with Currie Teed wrote the Idaho Power distribution article, was born with "juice" in his blood. His father was a line foreman for the Northern States Power Co. Servis is a native of Minnesota. His schooling was received at Fargo, North Dakota; he graduated from the State College there in 1933 with a B.S. (E.E.) degree. After a short term with the Jerome (Idaho) Water Co. and the U. S. Coast and Geodetic Survey, he took a job as oiler at Idaho Power's Swan Falls plant. Since 1937 he has been an engineer in the distribution department.

## Pages


**Blackout Lighting Control** ..... 33
Who shall control outdoor illumination and how it are interconnected through novel frequency changer.

**Systems Inter-Tied for Energy Exchange** ..... 35
Southern California Edison and San Diego systems are interconnected through novel frequency changer.

**Coordinated Fusing Plus Spill Gaps for Service Continuity** ..... 37
By C. N. TEED and J. F. SERVIS
Low-cost system developed by Idaho Power Co. for protecting distribution feeders against lightning.

**Bulb Snatching Is OK Now** ..... 46
By N. H. BOYNTON
Expert resume of the 1942 lamp situation with reference to stocks, sizes, types and substitutes.

Books ..... 6
New Products ..... 11
Bulletins ..... 28
Electra's Husband ..... 30
Engineering ..... 35
Lighting and Wiring ..... 42
Associations ..... 47
Sales ..... 51
Business Guide ..... 53
Editorials ..... 60
News ..... 64


Cover photo shows Washington Water Power's Sunset substation lighted for night protection.

## Preview

**Underground**

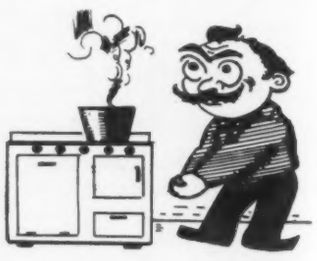
distribution is a many-sided subject. Because overhead distribution facilities in the business areas of moderate-sized, growing cities have "grown like Topsy," the problem of conversion to underground is a difficult one. This conversion does permit study and application of new techniques. One such has been developed for the progressive underground change-over being undertaken by Pacific Gas and Electric at Fresno. It will be discussed and described in detail in the next issue by two of the distribution engineers who worked it out.

**Directory**

Almost a score of pages in this issue are devoted to an up-to-date directory of the sources of supply for electrical materials, equipment and supplies here in the West. "Who carries the Blank line?" and "Where can I get parts for the Whatzis?" are two of the most frequently asked questions which this directory attempts to answer. Retain it because it may save many hours of frantic search when emergencies arise.

**Ranges, if any**

In these days it is unsafe to predict even the intended contents of next month's magazine, especially if it has to do with appliances. But unless ranges are frozen, as who can tell, stocks on hand in dealers' stores need to be sold and sold right. War may curtail production but it also makes more important some of the health



and nutrition-aiding attributes of electric cookery. This new emphasis will be outlined for dealer sales use in the Business Guide for next month.

# *This tail wags the "dog"*

**An achievement of Anaconda research aiding both our war effort and our industry.**

MINES . . . one of the necessities of our gigantic war effort . . . today rumble with the noise of *work*. To keep this rumbling rhythm steady and incessant, mining machines and transportation systems use large quantities of electrical power.

Here, a bustling locomotive carries its electrical power around with it . . . like a tail. Over sharp-edged rails, thumping over shaggy, splintered ties, reeling and unreeling as the locomotive moves back and forth, the "tail" . . . the copper power cable . . . stands up day after day delivering the ever-so-vital power without interruption.

Sunex Securityflex*, a product of Anaconda research developed to withstand not only the rough and tumble conditions of underground mining but also the sun blistering service of open pits, is the "tail" that's wagging many mining dogs. And the research that built it, the invaluable hours of patient experimenting and testing, now speeds to develop copper wires and cables for an even more potent war effort . . . for a greater industrial front . . . for use in mines, in war-vital plants, in bombers and battleships. 42243

*Trade Mark Reg.

ANACONDA
from mine to consumer

This familiar trade-mark symbolizes the best efforts of modern research and production.

**ELECTRICAL WIRES AND CABLES OF COPPER ARE THE LIFE LINES OF OUR NATION**

**ANACONDA WIRE & CABLE COMPANY**

*Subsidiary of Anaconda Copper Mining Company*

GENERAL OFFICES: 25 Broadway, New York City • CHICAGO OFFICE: 20 North Wacker Drive • Sales Offices in Principal Cities

# SIX STAR FEATURES that mean greater ON-THE-LINE performance!

★1 Simplified Supports for Direct Pole Mounting Cut Installation Time. Standard Support Spacing and Bushing Location Mean Complete Interchangeability of All Sizes and Makes.

AMERICA-AT-WAR demands that the distribution transformers you buy today must give you *greater on-the-line performance than ever before!*

To get this extra dependability, distribution engineers all over the country, more and more, are choosing *one* transformer above all others—

That's the new Allis-Chalmers EEI-NEMA Distribution Transformer . . . now leading the field with *six star features!*

Look these features over! See how they compare with any distribution transformer you ever heard of! Note especially—

★ Easier installation and interchangeability of parts!
★ Tested-under-pressure tank!
★ Spra-bonderizing, plus triple-coat auto finish!
★ Extra-heavy bushings!
★ Double conductor insulation!
★ Improved core and coils!

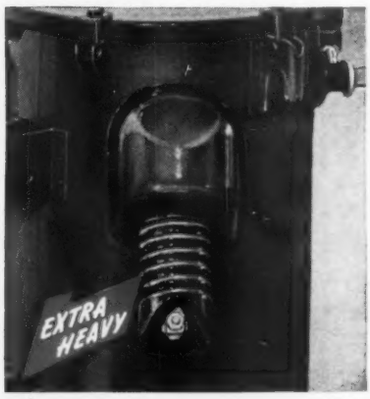
Don't overlook the lesson to be found in these great engineering advantages. For these are the reasons behind the big success of the Allis-Chalmers Distribution Transformer . . . reasons you should know about.

Write . . . *today* . . . for your copy of Bulletin B6159, giving you complete engineering information. Address Allis-Chalmers, Milwaukee, Wisconsin. A1489

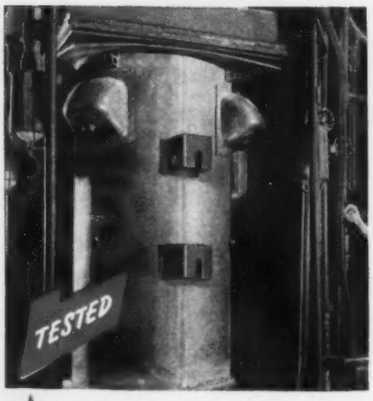
**ALLIS-CHALMERS DISTRIBUTION**

**6** **Improved Core and Coils, Liberally Designed with No Manufacturing Short Cuts... Mean Extra Years of Service-free Performance.**

**5** **Double Conductor Insulation ... Flexible Enameled Wire ... Plus Added Protection of Well-Lapped Cable Paper Give Double Safety Against Winding Failures.**




**4** **Extra-heavy Porcelain Co-ordinated Bushings with Liberal Creepage Offer Maximum Reliability Under Fog, Dust, Chemical or Other Adverse Conditions.**




**2** **New, Durable, Copper-Bearing Steel Tanks. Tested Under Pressures Far Greater than Normal ... Prevent Oil Leakage, Assure Long Life and Complete Safety.**

**3** **New Spra-bonderizing Process ... Plus Triple Coat Automobile Finish Give Tanks Positive Four-way Protection Against Rust and Corrosion.**

# TRANSFORMERS *Cut Operating Costs*

Twist-type Lamp Holder
Blk. Cat. 353 Wht. Cat. 353-W
Combined with Starter Socket Cat. 252. Pats. Pend.
Push-Type Lamp Holder
Blk. Cat. 253
Wht. Cat. 253-W
Combined with Starter Socket Cat. 252
Pats. Pend.
Lloyd Precision Products
Starter Socket Cat. 252
with "Lobster Claw" Dual Lock, used with No. 251 or No. 351 to make combination socket and lampholder No. 253 or No. 353. (Reg. U. S. Pat. Off.) Pat. Pend.
Remote Starter Socket Cat. 352
with "Lobster Claw" Dual Lock. Used separately for remote mounting. (Reg. U. S. Pat. Off.) Pat. Pend.
Lloyd
CERTIFIED
SPEC.
Lloyd
"NO BLINK"
FS-4NA
UL
Lloyd Starter (Certified by Electrical Testing Lab. Spec. 6)
FS-2 for 15 and 20-watt Lamps
FS-4 for 30 and 40-watt Lamps
Lloyd "No-Blink" Starter FS-4 NA
for 40-watt Lamps
(Listed and Approved by Underwriters' Laboratories Inc.)
Lloyd Precision Products are designed and engineered for perfect performance and the entire Lloyd line leads in streamlined efficiency. All are listed and approved by Underwriters' Laboratories Inc.
Lloyd Policy Insures Quality
LLOYD PRODUCTS CO.
Box C, Edgewood Sta., Providence, R. I.
Representatives in 22 Leading Cities
Export Office 100 Varick St., New York City

# BOOKS
## *you may want*

INSULATION OF ELECTRICAL APPARATUS by Douglas F. Miner, 460 pages, 6 x 9, 306 illustrations. McGraw-Hill Book Co., New York. $5. This book should be extremely timely because of the effect of critical defense material shortages on the development of substitute materials, particularly for insulation. The book is a key to insulation problems. Because of clear and concise treatment, it is of value to designers of all types of electrical equipment as a reference. Beginning with a discussion of dielectric or insulation phenomena and the theories of dielectric behavior, the author then takes up the nature, properties and usefulness of various insulating materials. Engineers will find the book of interest in better understanding the equipment they operate because of the several chapters on design, operation and construction of apparatus with particular reference to insulation. Final chapters give timely and useful information on testing methods and testing equipment which should be valuable to maintenance and test engineers.—C. R. B.

ASTM STANDARDS ON ELECTRICAL INSULATING MATERIALS, Dec. 1941, 450 pages, 6 x 9, paper cover, $2.25. Issued annually by American Society for Testing Materials, Philadelphia. This book provides in their latest form some 58 specifications and tests issued by ASTM covering this field. It is larger than previous editions, due to inclusion of new specifications and tests and several reports and papers. Outstanding activities of ASTM Committee D-9 on Electrical Insulating Materials are covered in certain of the reports and the 1941 report of the committee with its recommendations on standards is given.

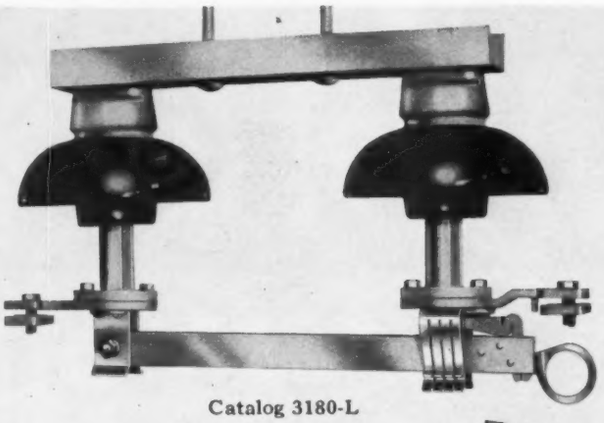
Included are sections on insulating varnishes, paints, lacquers and their products; molded insulating materials; plates, tubes and rods; mineral oils for electrical insulation; ceramic products; solid filling and treating compounds; electrical tests; insulating paper; mica products, rubber products; textile materials.

A detailed index and two tables of contents, one listing standards in numerical sequence are included.

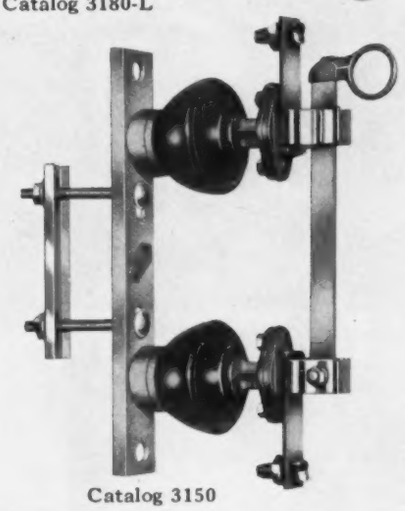
ELECTRICITY IN THE HOME AND ON THE FARM, by Forrest B. Wright, Second Edition, 372 pages, $2.75, John Wiley & Sons, Inc., N. Y. This book, while directed particularly to the school shop teacher, should be a useful text for anyone seeking the rudiments of the subject. It is divided into two parts: the first a series of 39 job sheets, arranged in order of their difficulty and a supplement giving directions for building laboratory equipment; the second 11 chapters of text on the fundamentals of electricity and its application and serving as a reference for the job sheets. Diagrams and illustrations are instruction aids, and suggestions to the teacher are included in the introduction. All parts of the book have been revised and the contents brought up to date. A chapter on wiring systems has been added and slight changes have been made in arrangement of the contents. The author's aim has been to adhere to fundamental principles which do not get out of date and to emphasize practical applications of these principles.

# OPEN TYPE
# MATTHEWS DISCONNECTING SWITCHES

Adaptable for Horizontal or Vertical Mounting



Catalog 3180-L

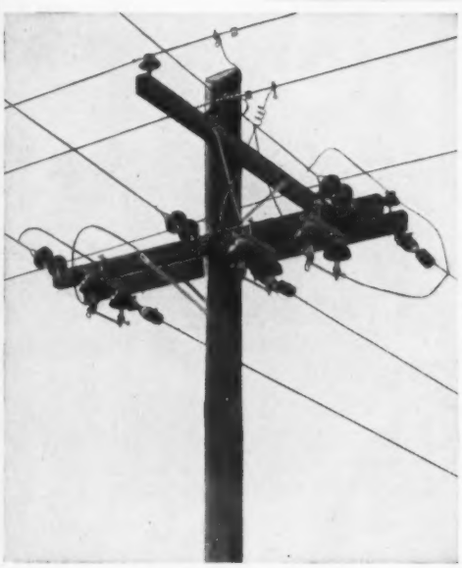


Catalog 3150

High Quality Materials Mean Lowest Time-Cost

•

No Radio Interference at Rated Voltage



Shows installation of Catalog 3158 Matthews Disconnecting Switches.

Matthews Disconnecting Switches are made in 200 and 400 Ampere sizes and 7.5, 15 and 23 Kv. Ratings.

*Write for Bulletin 106*
*It gives complete information.*

Where cost of equipment is limited due to low revenue lines, these low-cost, substantially constructed, hot stick operated Matthews Disconnecting Switches will meet your needs for economical and efficient operation.

Special insulators of our own design, have ample electrical values for their respective ratings in accordance with NEMA Distribution CUTOUT Standards, Publication 38-53. Galvanized certified malleable iron caps and pins are securely cemented onto insulators in accordance with our 96-hour natural cement curing process which has given perfect satisfaction in the field for over twenty years.

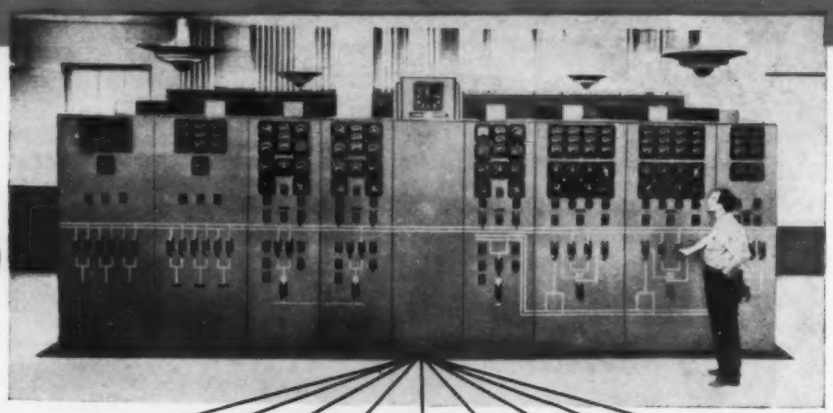
All current carrying parts are of at least 85% copper content material; all other metal parts are hot galvanized.

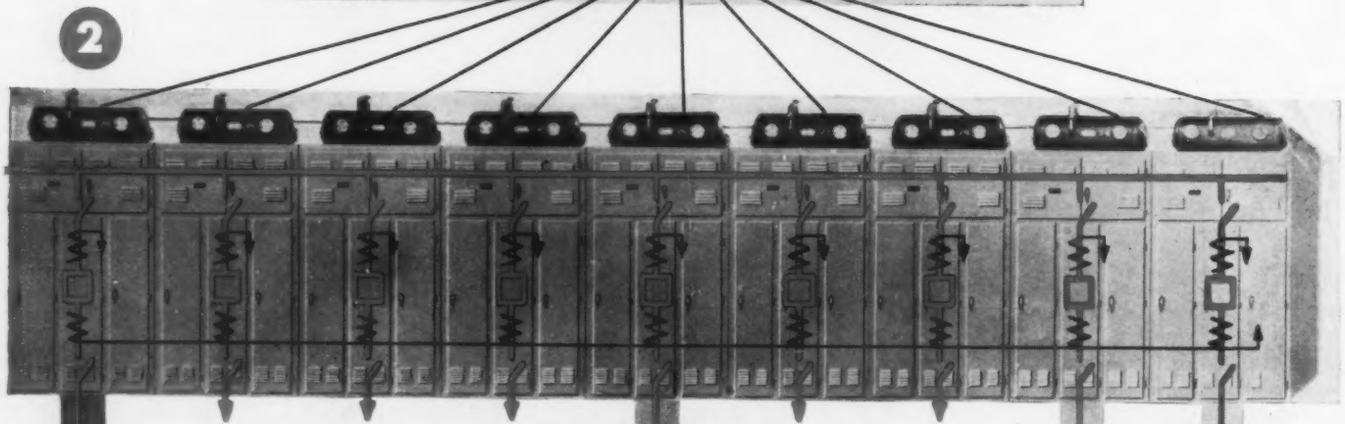
The 200-ampere Disconnecting Switches are equipped with single, heavy bus bar copper blades, while the switches rated 400 amperes have double blades. All can be furnished with blade latches, as illustrated, at additional cost.

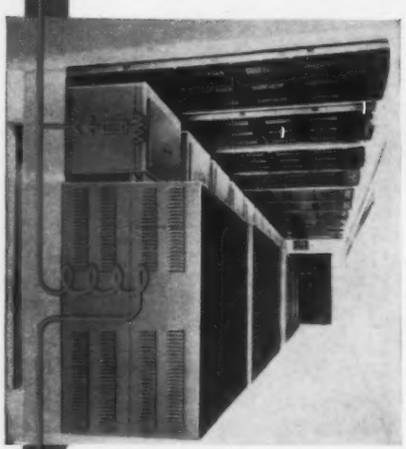
Female contact clips of bus bar copper, reinforced by spring phosphor bronze retainer clips, assure positive contact with no overheating, at full rated load.

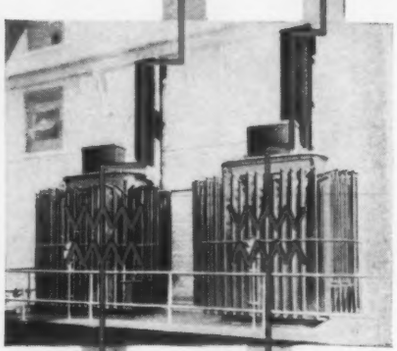
W. N. MATTHEWS CORPORATION
SAINT LOUIS, U. S. A.
ENGINEERS and MANUFACTURERS SINCE 1899

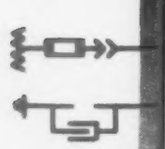
# NOW COMPLETE METAL-ENCLOSED

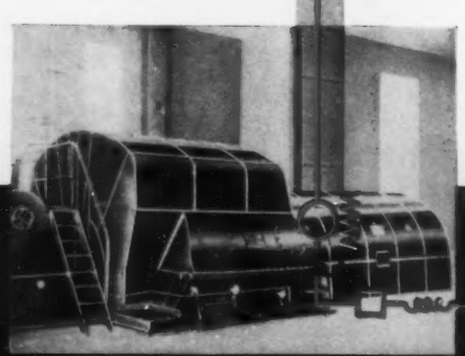


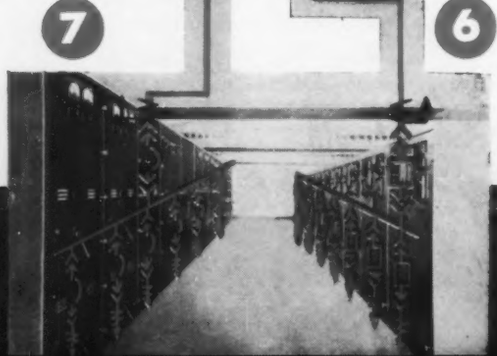









# SWITCHGEAR FOR YOUR ENTIRE STATION

## ALL THIS--
### CO-ORDINATED

1. **Metal-enclosed Duplex Switchboards** for centralized control and metering.
2. **Metal-enclosed FH Cubicles** for main power circuits, complete with air-blast or low-oil-content circuit breakers and all necessary primary equipment.
3. **Metal-enclosed Reactor Equipments** for the feeder circuits.
4. **Metal-enclosed Cable Entrance Equipments** for the feeder circuits.
5. **Metal-enclosed Bus Runs** for all primary connections.
6. **Metal-clad Switchgear** for the medium-capacity auxiliary circuits, complete with air or oil circuit breakers.
7. **Metal-enclosed Drawout Air Breaker Equipments** for the low-voltage auxiliary circuits, complete with circuit breakers, buses, interconnections, and interlocks.

## SELECT IT ALL at one time
## INSTALL IT ALL as a unit
## THIS means—

- ★ A single transaction—one company responsible
- ★ Speedy, easy installation at a low, predictable cost
- ★ All designed as a single unit—complete co-ordination of all functions
- ★ Simplified over-all station design
- ★ The greatest safety and operating dependability assured by modern, proved equipments

THESE are *standard* switchgear equipments, but they're *tailored* for today's tremendous wartime power and production requirements.

They are the equipments for which our factory is tooled—which we have prepared to manufacture in the shortest possible time.

They are the safest and most dependable equipments we know how to build.

When you select *any one* of these metal-enclosed equipments, you get everything completely co-ordinated, and it's shipped ready to install. You get the savings in installation time and space that go with it.

When you select *a number of*—or all of—these equipments, you get more of the same savings in time and space, *plus* an extra degree of over-all co-ordination that may make possible a simplification of your entire station design. Ask your G-E office for Bulletin GEA-3742, or write to General Electric Company, Schenectady, New York.

*General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of ordnance.*

# GENERAL ELECTRIC

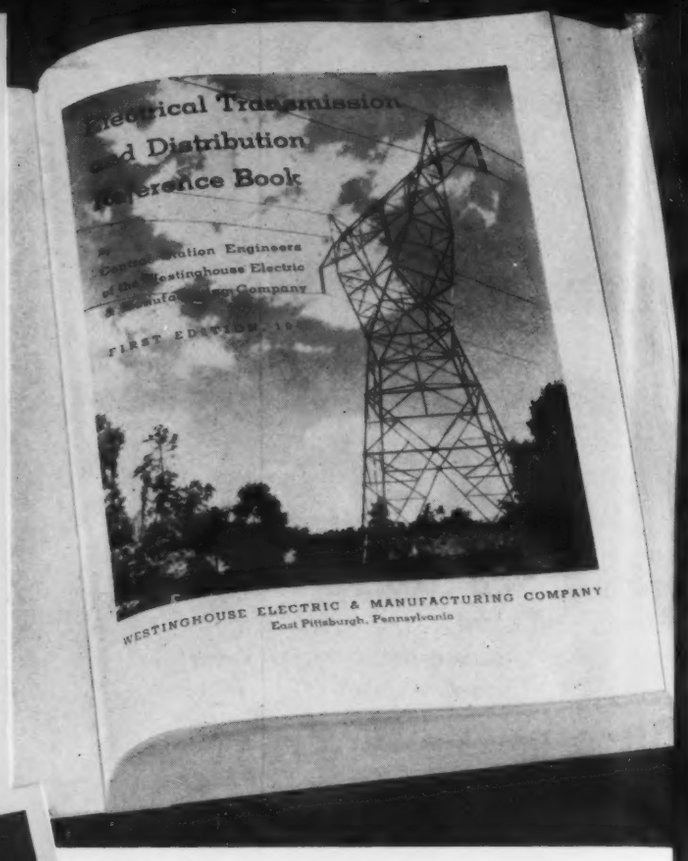
# Westinghouse Briefs

## *Announcing a* NEW Reference Book

**Today, over two decades since the first edition of William Nesbitt's classic book "Electrical Characteristics of Transmission Circuits," transmission line voltages have doubled, lines are longer, interconnections are more extensive and new methods of calculating performance have been adopted. To assist in solving the increasingly complex problems brought about by these changes, Westinghouse has completed a new book, the *"Electrical Transmission and Distribution Reference Book,"* which may be purchased after March 31st. Price, $5.00. Address Westinghouse 3N52, East Pittsburgh, Pa.**

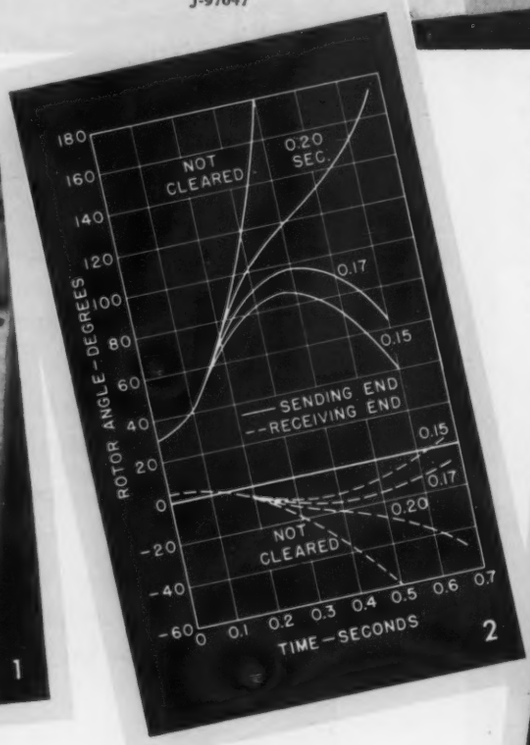
**WESTINGHOUSE ELECTRIC & MFG. CO., E. PITTSBURGH, PA.**

J-97047




**NEW AUTHORITATIVE TEXT**—In writing the *Electrical Transmission and Distribution Reference Book*, fourteen Westinghouse Central Station Engineers contributed their specialized and practical knowledge. They were aided by other specialists and by co-operative studies with electric power companies. This comprehensive background makes the new text an invaluable aid in solving everyday power transmission problems.

1



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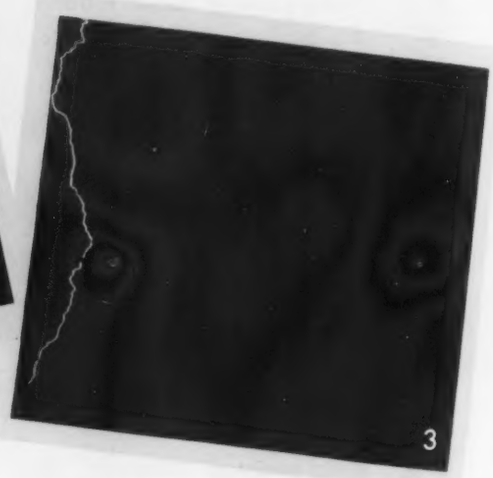
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**1 MODERN MACHINES**—These four 20,888 kv-a umbrella-type water wheel generators illustrate the typical modern machines discussed in the chapter, "Machine Characteristics." A great number of drawings, formulas, and diagrams are used throughout the book, giving unusual clarity to explanations.

**2 CALCULATING STABILITY**—The effect of circuit breaker clearing time upon system stability, shown in the figure above, is one of the many calculations covered in the chapter "System Stability—Examples of Calculation." Other chapters deal with every important phase of modern transmission line study.

**3 PROVES THEORY**—Field station records of this stroke of lightning, photographed as it struck close to a 250 kv line, showed no abnormal voltage. The new book explains how this instance was responsible for establishing protection against direct strokes as the basis for line design.

Westinghouse

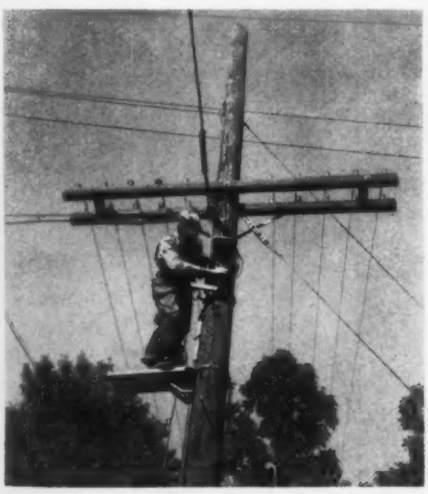
# PRODUCTS
## *that are news*

### Protective Illumination (300)

Goodrich Electric Co. is manufacturing a new Elipso Standlite, for protective illumination in industrial plants. The fixture conforms to FBI specifications, according to the manufacturer, and provides a wide lateral distribution of light due to its elliptical shape. It is claimed that with proper spacing, a brilliant barrier of light is created around property lines without illuminating buildings and grounds, and that watchmen remaining in the darkness can spot instantly the entrance of any intruder into the brightly lighted fence or boundary area. With the low mounting height, lamps of from 300 to 500 watts are said to deliver a high intensity of illumination. The Elipso Standlite is available in two styles—Direct, which delivers light laterally, and Angle, which provides a slight forward throw. It is finished in permanent porcelain enamel, entirely weatherproof and fixtures are easily installed and serviced, the manufacturer claims. The fixture is designed for mounting on a standard two-inch pipe.

### Economy Platform (301)

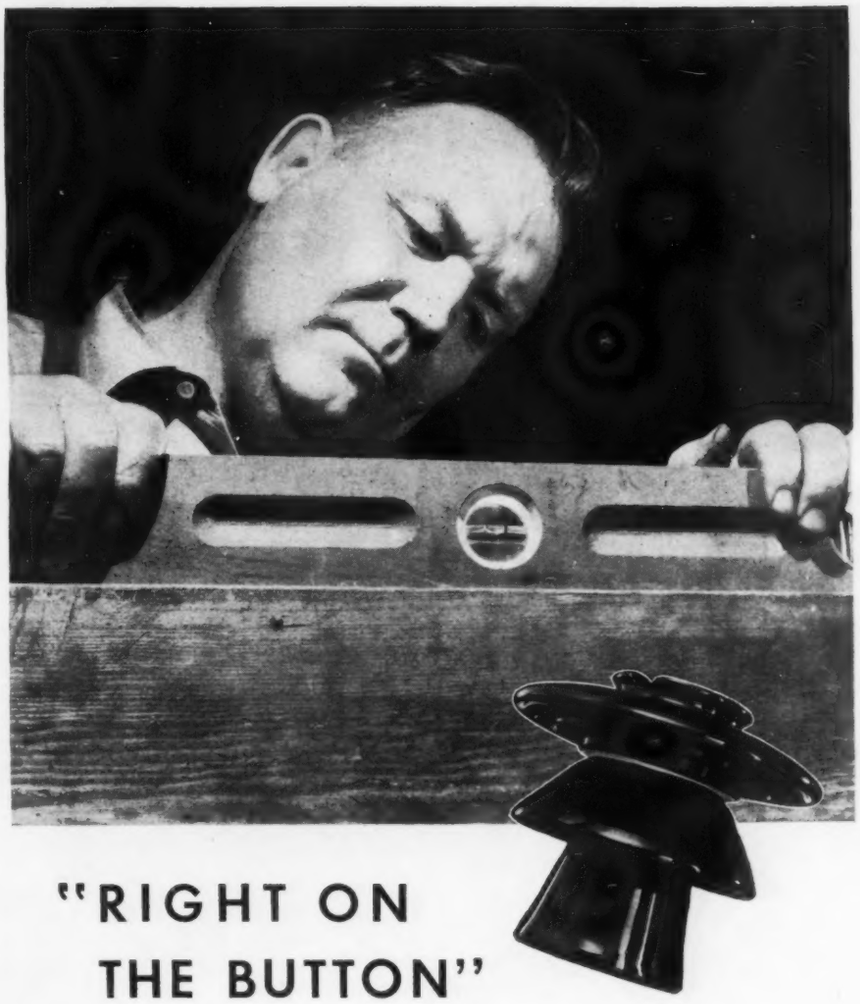
A new economy platform is being manufactured by the A. B. Chance Co. for use where a lineman otherwise would be required to stand in his climbers for long periods; where working space is limited; or where



maximum economy is desired. According to the manufacturer, the platform is easily attached to the pole by use of a single chain tightener and is sufficiently strong to support the weight of one man. It is available in 24- and 30-in. lengths. A collapsible pole railing has been designed to use with the platform for additional safety and freedom of movement.

### Insulation Tubing (302)

Irvington Varnish & Insulator Co. has announced its new "Fibronized Koroseal Tubing" designed for use as electrical insulation by manufacturers in the electronic, instruments, aircraft, electrical appliances and power industries. The product was developed from Koroseal, a product of the B. F. Goodrich Co. and, according to the manufacturer,

"RIGHT ON THE BUTTON"

SKILLED craftsmen ordinarily take few chances. Today, as America goes into "all-out" war, only perfection can pass muster. Laboratory control, such as we practice at Victor, leaves no doubt about the finished product's quality. Combine this control with modern manufacturing technique and the hard earned skill of our craftsmen, and you have the reason why Victor Insulators have become synonymous with lasting, economical and safe performance in use.

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"REMEMBER PEARL HARBOR"

THE MARK OF A V GOOD INSULATOR

VICTOR INSULATORS INC.
VICTOR, NEW YORK

# NO PLACE TO TAKE A CHANCE .. HE RELIES ON KLEIN

*"Since 1857"*

Up at the top of a pole is no place to gamble with tools. That's why you will find Klein pliers in the hands of linemen—everywhere! They know the inbuilt quality, the years of experience, the reputation for service that is back of every pair.

*Your copy of the Klein Pocket Tool Guide will be sent on request.*

**ASK YOUR SUPPLIER**

*Foreign Distributor:*

**International Standard Electric Corp., New York**

Mathias **KLEIN** & Sons

Established 1857 Chicago, Ill. U.S.A.

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its advantages include inside and outside smoothness, exceptional elasticity and close manufacturing tolerance. It has excellent resistance to acids, alkalis, solvents and heat; is fireproof and possesses an insulation resistance of infinity after 16 hours at 90% R.H. and 105° F., the manufacturer claims. Tensile strength, 2845 lb. per sq. in.; dry dielectric strength (.022 in. wall thickness) 1050 VPM; wet dielectric strength (.022 in. wall thickness) 817 VPM after 24 hours immersion. The tubing comes in ASMT sizes and in a variety of colors including a transparent shade.

### Allis-Chalmers Motor (303)

Allis-Chalmers has developed a new Lo-Maintenance motor with a "Safety Circle" designed to give it complete all-around protection. This "Safety Circle" is a wide, solid rib (integrally cast as part of the frame) which forms an unbroken circle of protection around the stator. One-piece cast frame and cast end-shields guard the motor from

exterior knocks and abuse; improved bearing design delivers smoother performance with full-flow lubrication and easier maintenance, according to the manufacturer. It is claimed that a more liberal use of electrical materials makes this motor internally and electrically stronger because current and magnetic densities are less extreme; and additional cross strength has been built into the distortionless stator for maximum power efficiency. The rotor is keyed to the shaft for strength and its outer surface is turned for smoothness and an accurate air-gap. Other features are oil drains at the bottom of bearings for easy flushing; removable end-pieces; and large conduit box for handy wiring, according to the manufacturer.

### Red Insulator (304)

The John C. Dolph Co. claims a high caustic resistance for its Synthite No. 10 Red Insulator and reports that in recent tests the material showed no signs of deterioration or breaking down from caustic action after a prolonged bath in a 3% solution of caustic soda. In addition the material is said to offer maximum resistance to the attack of acids and oil. According to the manufacturer it air-dries dust free in one-half hour, tack free in two hours and hard in eight hours, and its caustic resistance can be improved by baking treated units from one to two hours at about 200°F. after air-drying for four hours. It may be obtained in 1 qt. and in 1, 5, 30 and 55-gal. containers. For test purposes, the material is available in 1 qt. containers at $1.20 per qt.


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**Brings our Services to You**

Wherever you work or live, Mailway Banking brings the outstanding services of this bank right to your doorstep. Probably nine out of ten of your banking transactions are routine anyway, so why not handle them by mail? Our special Mailway envelopes and forms assure confidential and safe handling, with overnight service to most points in California.

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ONE MONTGOMERY STREET

**COHARDITE**

INSULATED TOOLS

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**No. 155 SCREW DRIVER**

List Price

**$1.10**

A long, thin, well-insulated screw driver. Ideal for reaching deeply recessed screws. Made with Stanley 100 plus quality blade to U. S. Navy specifications. COHARDITE insulated all the way down the blade to within 3/8" of the point.

Every tool tested to its full rated dielectric strength, of 10,000 volts for one minute RMS before it leaves our plant.

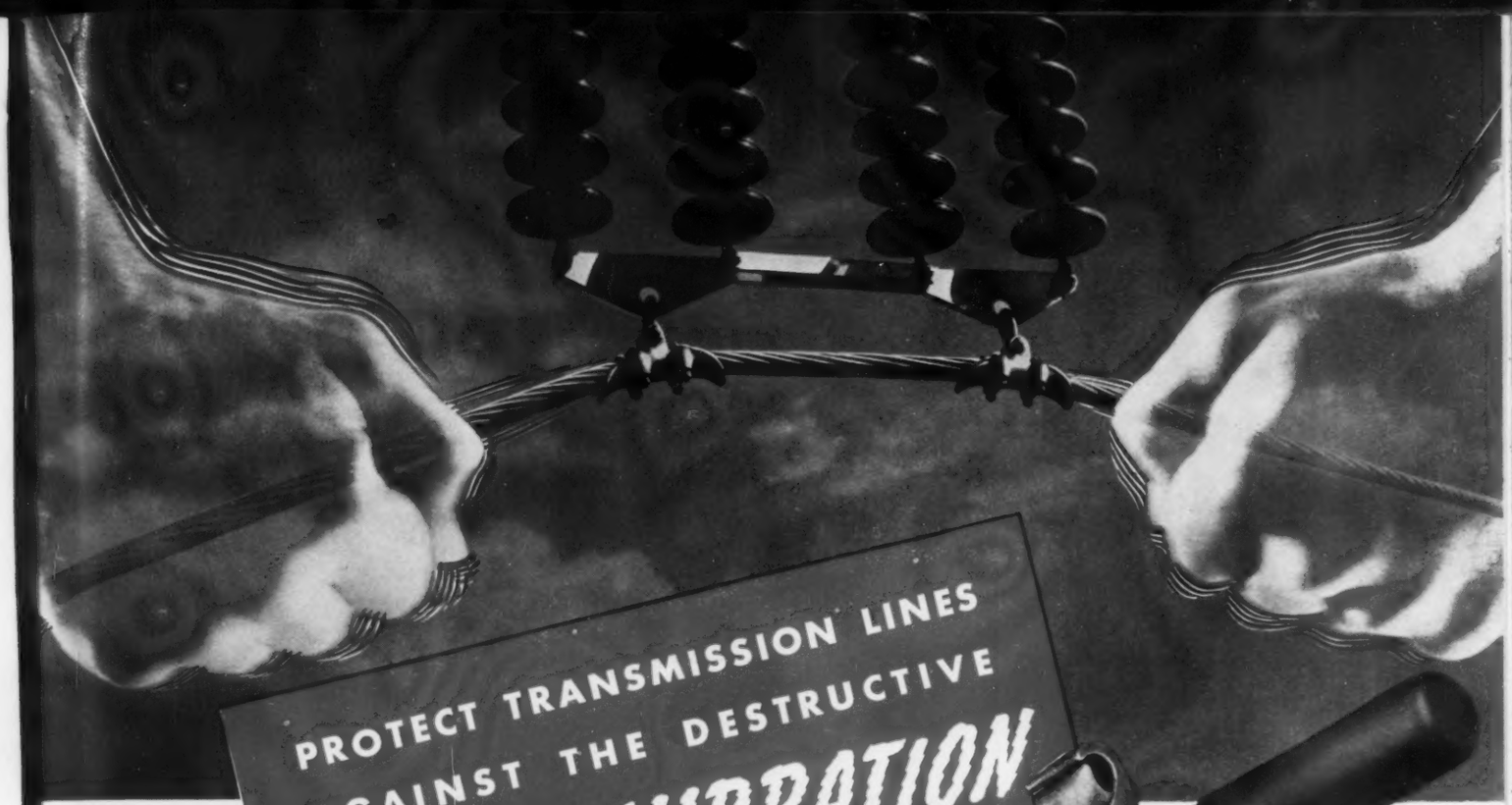
A full range of COHARDITE insulated small tools carried in stock for meter and distributor departments.

*Send for a catalog.*

**The Connecticut Hard Rubber Co.**

**NEW HAVEN, CONN.**

Heckensmith Sales Co., 443 S. San Pedro St., Los Angele.
Ned Licht Co., 97—9th St., San Francisco

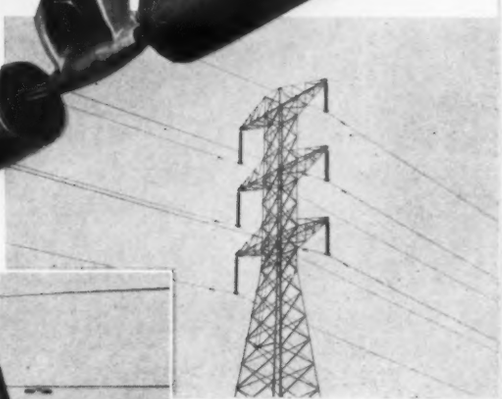


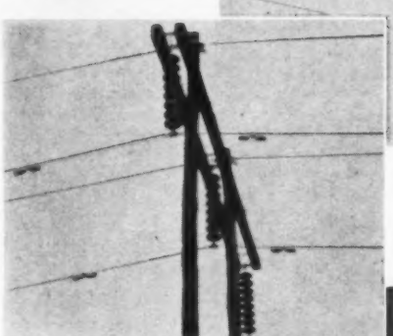
# PROTECT TRANSMISSION LINES AGAINST THE DESTRUCTIVE HANDS OF VIBRATION

## ...with STOCKBRIDGE DAMPERS

Destructively at work on transmission line conductors, the elusive and unseen hands of vibration are extremely difficult to locate, despite frequent occurrence. Their stealthy attack is made most frequently throughout the night and particularly in the early morning hours, when prevailing air currents and cross winds are steady and undisturbed by heat. In time, by rapidly bending the conductor up and down through a small amplitude, vibration will cause fatigue breaks of conductor strands at points of support.

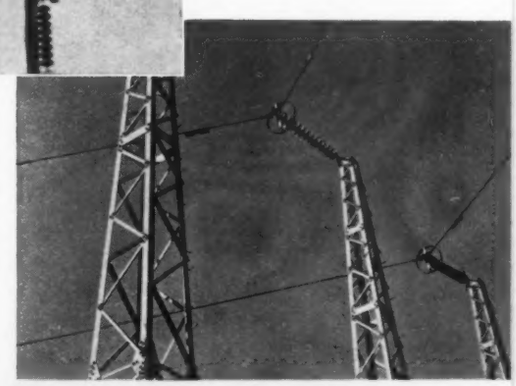
Stockbridge Dampers placed on overhead conductors, a measured distance from the insulator ties, will arrest this destructive force by absorbing the energy of incipient vibrations and preventing the build up of amplitude. Installation is readily made with hot-line tools without interrupting service and without disturbing existing suspension or dead-end clamps.





*Three types of construction on which Stockbridge Dampers have been effectively installed.*

*Stockbridge Damper (patented) is manufactured exclusively by Hubbard and Company for the entire Pacific Coast. For prompt service on standard items of Hubbard Pole Line Hardware and Peirce Construction Specialties, see your nearest branch of Graybar Electric Company or General Electric Supply Corporation.*



HUBBARD

**Hubbard and COMPANY**

OAKLAND, CAL. PITTSBURGH CHICAGO

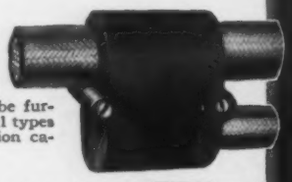
HUBBARD

HANG THE LOAD ON HUBBARD HARDWARE

*from the* MOST COMPLETE lin
of Cable Taps

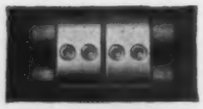
Now you can select from a really *complete* line of standard and special taps. Every one carefully designed and manufactured.

Parallel and 90° taps — and combinations — in the widest variety. For conductor sizes up to 1,000,000 CM.

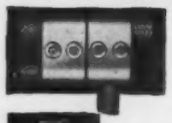


**Gutter Tap with Bakelite Cover.** Insulating covers can be furnished for all types of Penn-Union cable taps.

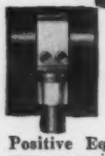
**2-way Gutter Tap.** Main and branch sizes 8 to 1,000,000.



**Two Separate Parallel Taps** to a continuous main conductor.



**Combination Cable Taps;** one branch parallel to main, and one at 90°.



**Hinged Clamp** of Penn-Union Type HFM makes installation easy. Multi-slit tapered sleeve assures permanent grip on branch.

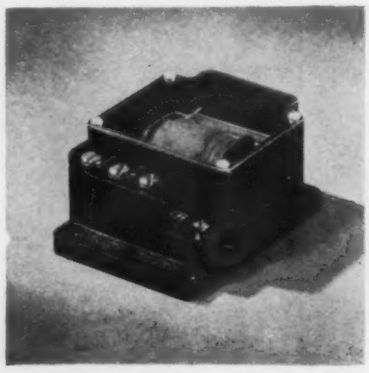
**Positive Equalized Pressure** on main and branch, with Penn-Union Type SM. Tightening torque is accurate measure of the clamping force.

KENNETH ANDERSON CO.
2115 So. San Pedro St., Los Angeles
NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington
F. M. NICHOLAS CO.
1123 Harrison St., San Francisco
Penn-Union Electric Corp., Erie, Pa.

**PENN-UNION**
Conductor Fittings


## D. C. Relay (305)

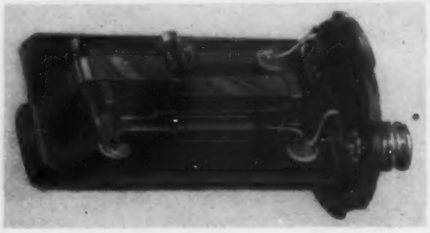
General Controls Co. has designed CS Series, sensitive, DC relays for such applications as vacuum tube plate circuit controls; photo electric cell devices; sensitive temperature and pressure control; and mobile applications such as radio in aircraft and marine services. Mounted within a molded



phenolic enclosure and covered with a removable transparent window, they are, according to the manufacturer, dustproof, protected from damage and readily accessible. Outstanding improvements claimed by the manufacturer are stability of adjustment (fixed contact spacing maintained with gap adjustment); increased contact pressure; freedom from sticking; light weight—6½ ozs.; moisture-proof coils; low input wattage. They are said to be unaffected by extreme variations in temperature and air pressure and are available in many combinations of coil and contact ratings.

## Premium Mirastat Starter (306)

A new line of fluorescent lamp starters designed to protect ballast and starter and to eliminate the flashing of failed lamps has been developed by Hygrade Sylvania Corp. Called "Hygrade Premium Mirastat Starters," they will supplement the standard line and will be slightly higher in price. The manufacturer claims that they are entirely different in principle from any starters of the kind on the market. The Premium Mirastats automatically open the circuit when a lamp fails and are said by the manufacturer to be specially suitable for installations that make immediate replacement of a burned-out lamp impractical.



## Knapp Shaver (307)

The 1942 model Knapp Natural Angle Shaver is finished in black plastic, with a chrome plated shaving head, two sizes of cutting slots—for coarse and fine beards—and a powerful, new type motor operating at 6,500 rpm., according to the manufacturer, who claims that the natural angle of the head makes it unnecessary for the purchaser to learn a new method of shaving.


*Sherman*
**SPLICING SLEEVES**
*Precision Made for Enduring Service*

Split Tinned Sleeve

the "Figure 8"

Seamless Oval

These Sherman Splicing Sleeves make the finest of joints—strong, secure, free from corrosion. All sleeves made to accepted standards of the electric utility trade, stamped for identification, and carefully packed. For uniformity and unfailing dependability, standardize on Sherman sleeves.

**H. B. Sherman Mfg. Co.**
Battle Creek, Michigan

*Write* —for Sherman catalog illustrating the complete Sherman line of Electrical specialties and giving full specifications.

**=ECONOMICAL=**
**Jeffries Transformers**

**Reasonable in Price**
**Reliable in Performance**

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog

**JEFFRIES TRANSFORMER COMPANY**
1710 E. 57th St. Los Angeles, Calif.

# A LINE OF *Better* OIL-IMMERSED STARTERS

## FOR HAZARDOUS AND CORROSIVE ATMOSPHERES

### *Easier to Install, Operate and Service*

In chemical plants, oil refineries, powder and shell loading plants—wherever the presence of corrosive or explosive gases makes oil-immersed starters a necessity—this new Square D line is ready to do a job.

**Easy Installation**—Cast head with wiring manifold permits conduit entrance from five directions. Removable cover plate facilitates threading bare wire through insulating spacer above oil bath.

**Easy to Service**—Welded seam tank is designed for *minimum* quantity of oil. Tank has large, window-type oil-level gauge. Drain cock is recessed in bottom. Track-type guides prevent swinging and splashing or accidental collision with starter panel while tank is being raised or lowered. Hooks at bottom of guide track support tank in lowered position for inspection. Starter parts are readily accessible.

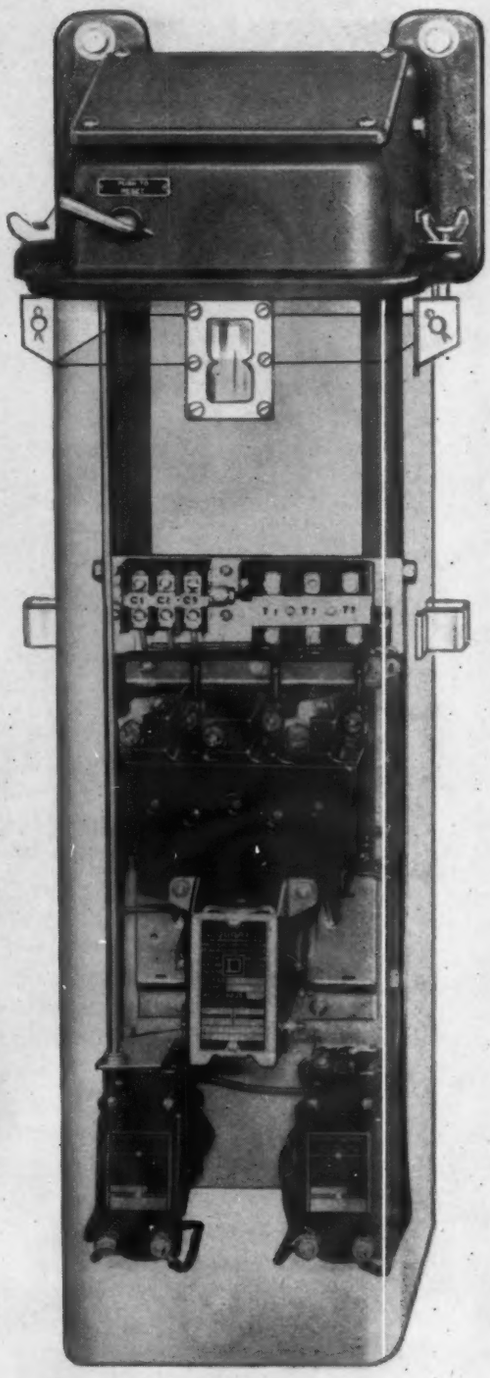
**Efficient Operation**—Magnetic overload relays are adjustable to suit conditions of application. Either hand or automatic reset relays are available. Removal of tank from a combination starter *automatically* throws breaker to "off" position.

★ ★ ★

Two types of oil-immersed enclosure construction are available—(1) Corrosion resisting and (2) Explosion resisting for Class I, Group D hazardous locations.

Either type can be furnished with any one of the following four classes of motor control equipment:

1. Class 8537 line voltage starters.
2. Class 8539 combination starters.
3. Class 8737 reversing starters.
4. Class 8810 two speed starters.



**SQUARE D COMPANY**

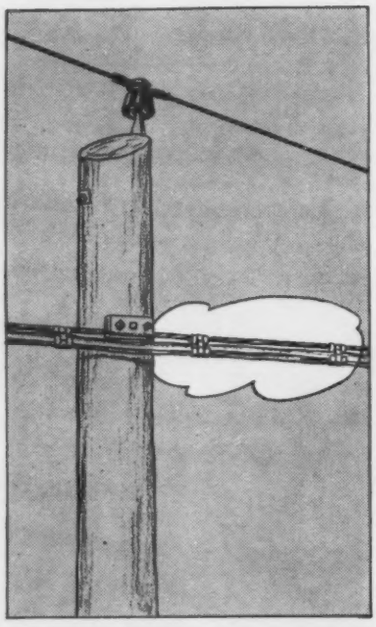
LOS ANGELES - DETROIT - MILWAUKEE

KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

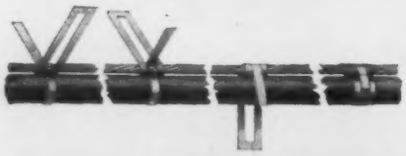
**CALL IN A SQUARE D MAN**

# Reduce Outages
# Avoid Cable Wear
# Reduce Maintenance



**RELIABLE CABLE HANGERS**

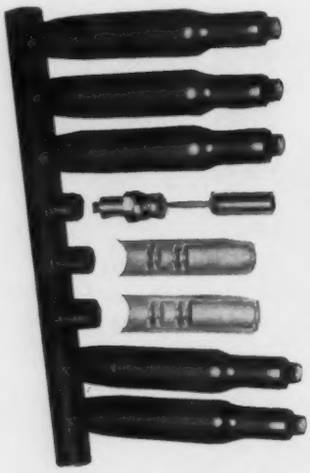
Prolong life of cables and conserve strategic materials by eliminating wear on cable sheaths or on insulation of hand made cables. Reliable cable hangers hold cable and messenger together tightly with wide bearing surfaces which eliminate snaking and chafing. They are easily applied and make installations that are permanent and very neat



Reliable ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
3145 LANDRIL AVENUE CHICAGO, ILLINOIS


## Insulated Connector (308)

A new type of insulated connector designed for use in the junction or limiter boxes of industrial secondary networks has been announced by Burndy Engineering Co. The connector, a special Burndy Mole equipped with Molimiters, provides a simple and compact means of interconnecting the ties of the



network, joining the ties to the network transformers and tapping off any number of loads, according to the manufacturer.

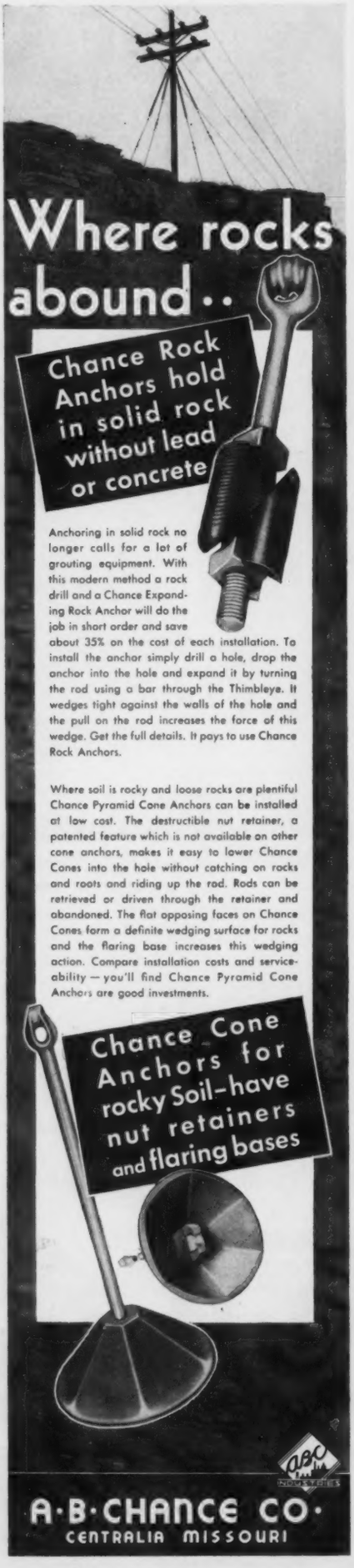
The development has been designed to help carry out important functions of the industrial network system, including greater reliability, better voltage regulation, greater flexibility, sabotage protection and easy expansion, the manufacturer claims.

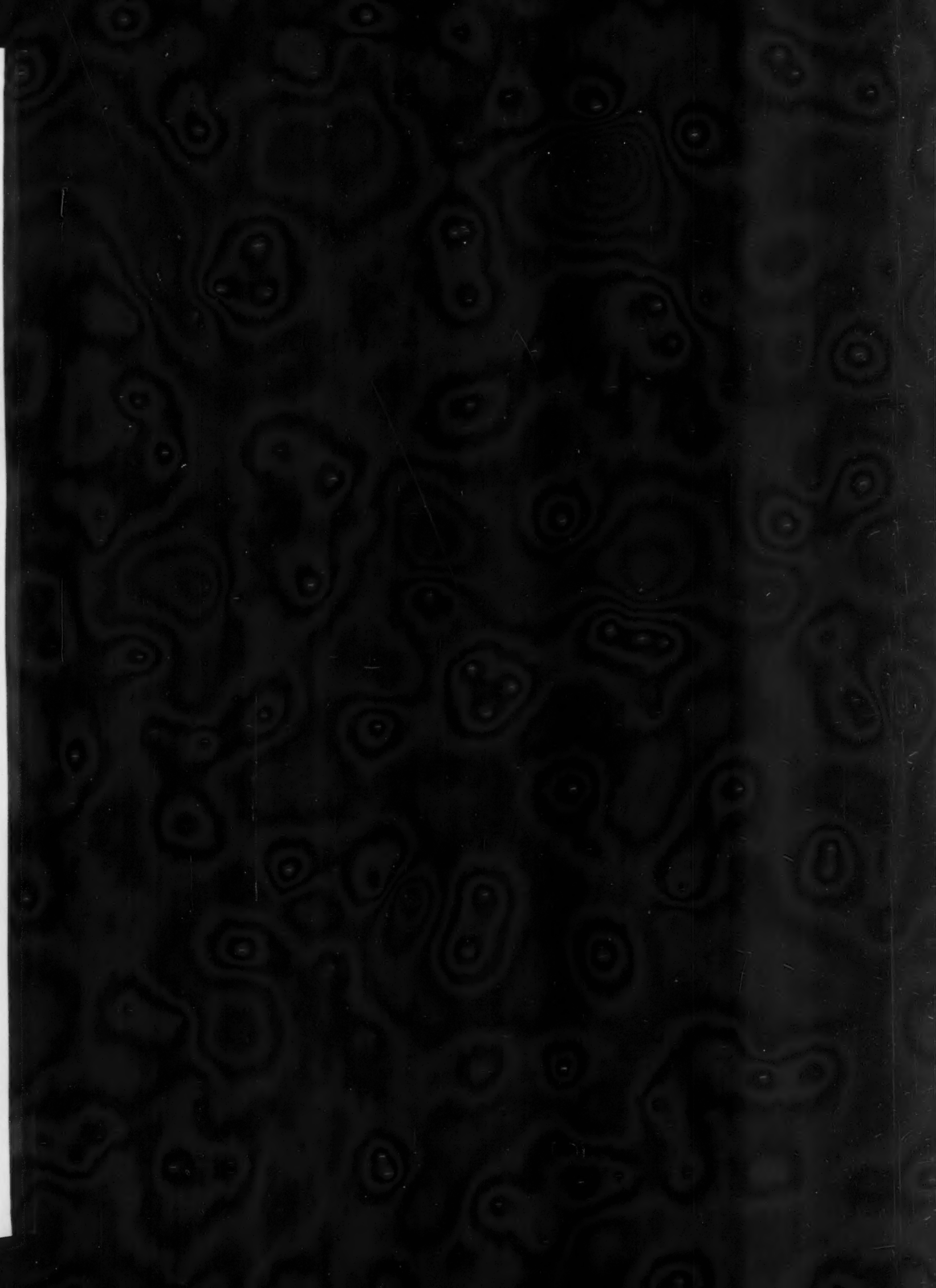
The special Mole consists of a central conducting body surrounded by a molded insulating jacket and containing any number of cable outlets. Because of the flexibility in the number of outlets, extra taps can be added without disturbing existing connections. To isolate faulty ties, or faults in any of the joining cables, each outlet is provided with a Molimiter—an easily installed fusible element enclosed in an arc-proof chamber, the manufacturer states. Cable connections to the Molimiters are quickly and easily made by means of the Burndy Hypress.

The new Mole is furnished in many types. Type ZMEJ (shown) has extended ends, which permit the connector to be supported on grooved insulating strips mounted in the limiter box. The assembly is furnished with any specified number of outlets and the design can be modified to suit individual needs.

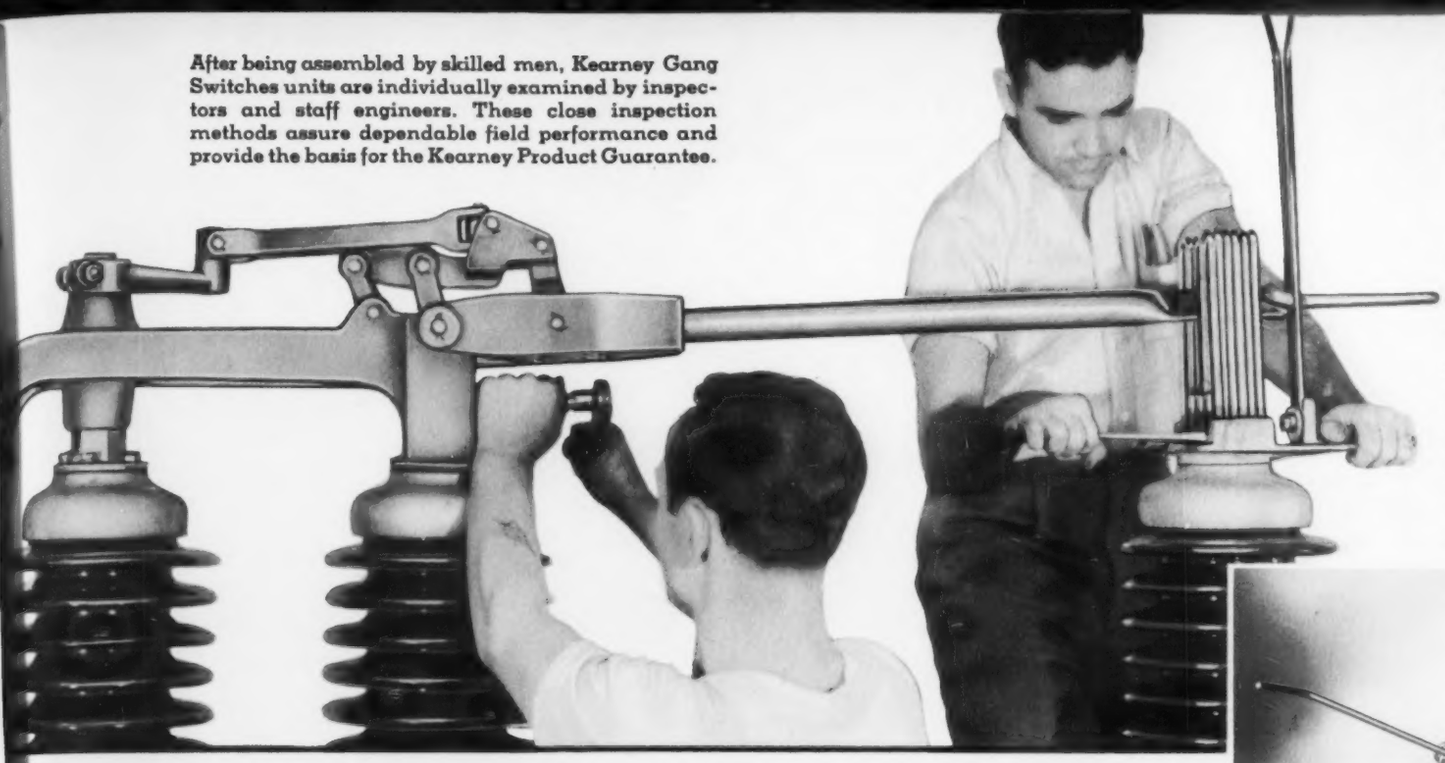
## Tank Type Cleaner (309)

Time and health saving devices for speedy cleaning are featured in the 1942 Universal three dimensional tank type cleaner. A Germ Trap situated at the base of the dust bag purifies the air as it is sucked through the hose by means of the whirlwind super suction. With metal cap and bag removed from the suction end and with the motor running the cleaner can be placed in a sick room to purify the air, according to the manufacturer. Other features are the "Tattle Tale" light which flashes on when the bag needs emptying and stays on until it is thoroughly cleaned; and the thread picking nozzle which does not drag or seal on rugs. Twelve attachments clean rugs, dust and polish wax floors, clean bare walls, fireplace, screens, radiators and clothing. The "Tattle Tale" cleaner demoths, deodorizes, sprays insecticide on plants and paint on furniture.



Where rocks abound..
Chance Rock Anchors hold in solid rock without lead or concrete
Anchoring in solid rock no longer calls for a lot of grouting equipment. With this modern method a rock drill and a Chance Expanding Rock Anchor will do the job in short order and save about 35% on the cost of each installation. To install the anchor simply drill a hole, drop the anchor into the hole and expand it by turning the rod using a bar through the Thimbleye. It wedges tight against the walls of the hole and the pull on the rod increases the force of this wedge. Get the full details. It pays to use Chance Rock Anchors.
Where soil is rocky and loose rocks are plentiful Chance Pyramid Cone Anchors can be installed at low cost. The destructible nut retainer, a patented feature which is not available on other cone anchors, makes it easy to lower Chance Cones into the hole without catching on rocks and roots and riding up the rod. Rods can be retrieved or driven through the retainer and abandoned. The flat opposing faces on Chance Cones form a definite wedging surface for rocks and the flaring base increases this wedging action. Compare installation costs and serviceability — you'll find Chance Pyramid Cone Anchors are good investments.
Chance Cone Anchors for rocky Soil—have nut retainers and flaring bases
ABC INDUSTRIES
A·B·CHANCE CO·
CENTRALIA MISSOURI



After being assembled by skilled men, Kearney Gang Switches units are individually examined by inspectors and staff engineers. These close inspection methods assure dependable field performance and provide the basis for the Kearney Product Guarantee.



# a STATEMENT and some SUGGESTIONS to OPERATING MEN

TEN YEARS AGO, your attention was called to the development of a practical gang operated switch which you could well afford to use for 13 KV, and lower applications.

At that time, the Kearney Corporation received nation-wide recognition for bringing to the Industry, gang switches, illustrated in Figure 1, which were sturdy and light-weight — weighing from 50% to 60% less than other switches on the market at the time and — selling at a substantially low price which permitted their wider use.

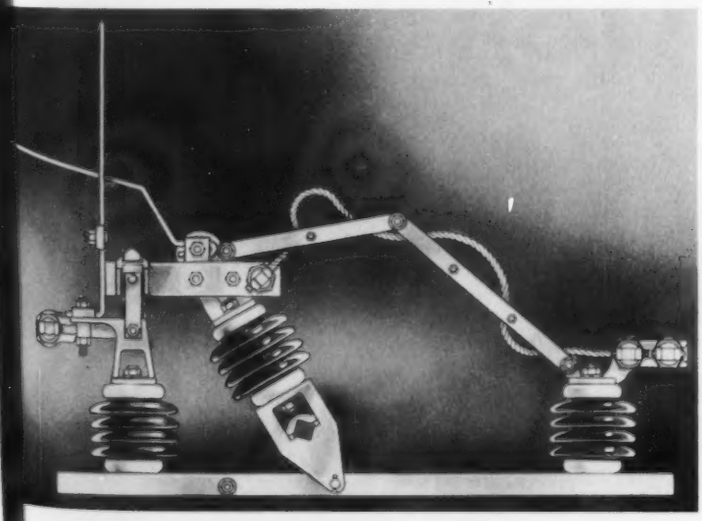
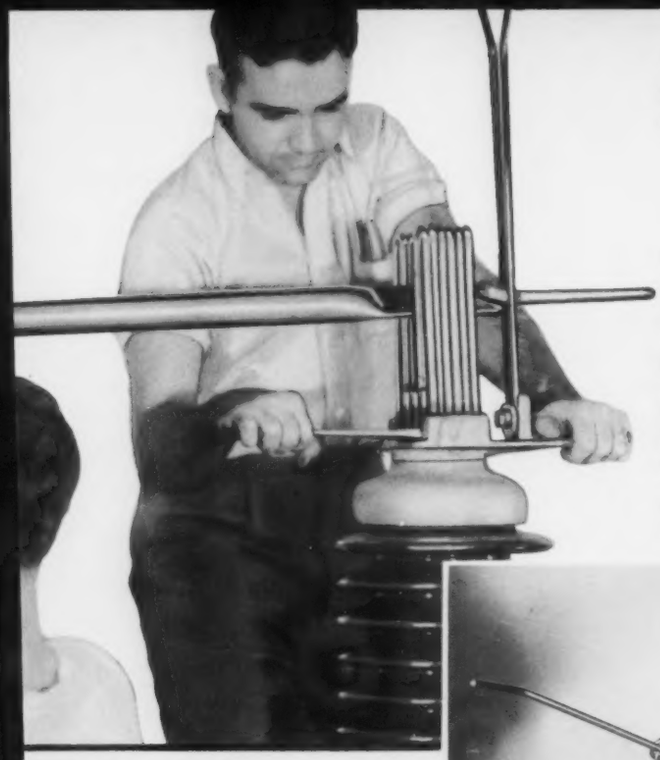


FIGURE 1

Then followed other Kearney developments and improvements. Figure 2 shows a 3-insulator Kearney Gang Operated Switch — a rocker-type switch featuring multi-point pressure contacts and a point pressure pantograph arm which eliminated the use and troubles of cable at this point. Today these switches are available in ratings of 7500 volts to 34,500 volts, 200, 400 and 600 amperes.

Another Kearney development is the wheel-action type horizontal, single-break rotating insulator type switch, Figure 3, which has been quickly recognized for its sleet-breaking action — available for voltages up to 115,000 volts. Figure 4 shows a modern vertical break Kearney Rotating Insulator Type Gang Operated Switch. Husky, rugged switches for

FOR BETTER MAINTENANCE and CONSTRUCTION — Use KEARNEY



# NT and STIONS G MEN

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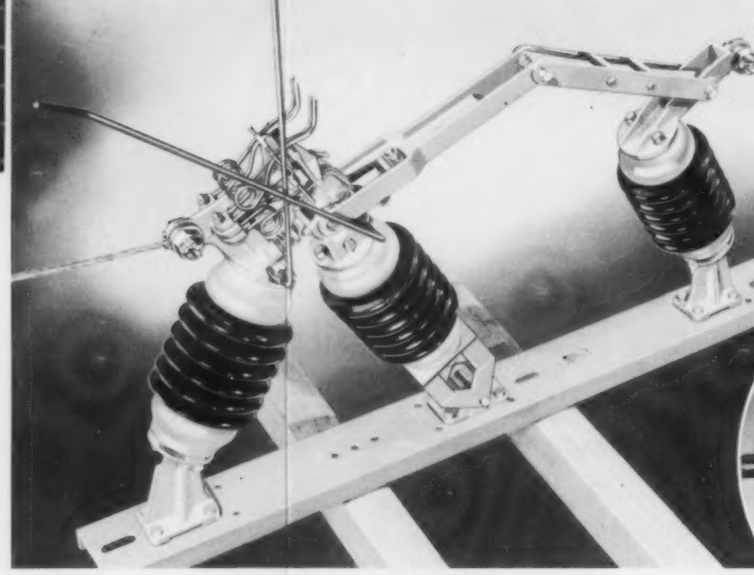


FIGURE 2

## A STATEMENT OF FACT

From the day, ten years ago, that the Kearney Corporation introduced its first gang switches to the field, to the present moment, operating men have been generous in their favorable comments practical design and dependable operat these switches. These various types of sw are recognized as a modern means o viding better system operation and c

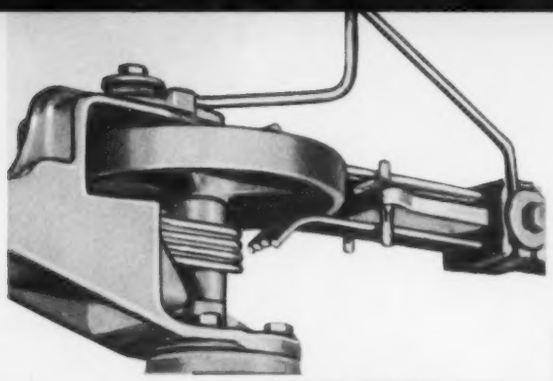
## A TIMELY SUGGESTION

Now, as power companies are being pr harder and harder to meet the urgen mands for power, is a good time to an systems and to study the advantages Kearney Gang Operated Disconnect Swi provide to give better service to Defens dustries . . . These switches, as you have a definite function in transmissio distribution systems — at substations Defense Production Customers' transf stations.

May we suggest that we, as manufact of this type of equipment, are anxious to with you in your problems which are c up as Defense demands are being made

In the event that special problems pr themselves on your system, don't he to call upon the Kearney Engineering D ment for any suggestions which they

Use KEARNEY PRODU



Close-up of wheel-action. Opening and closing of the blade assures positive "wiping" action. The contact wheel, which revolves slightly with each operation, provides a unique means of breaking sleet, should the occasion arise. Note that contacts are multi-point pressure type.

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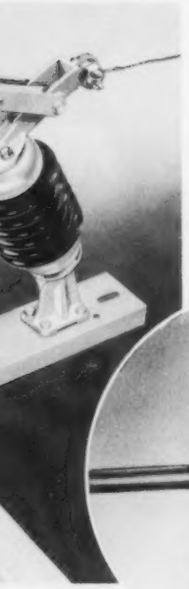


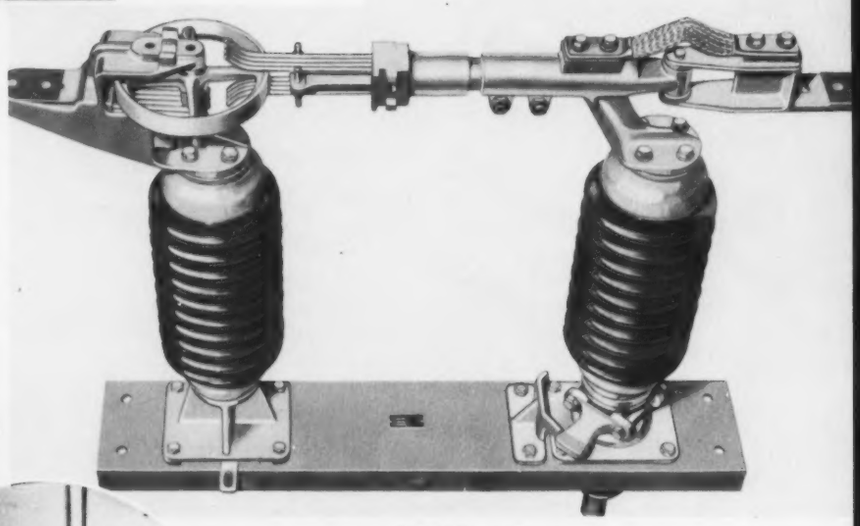
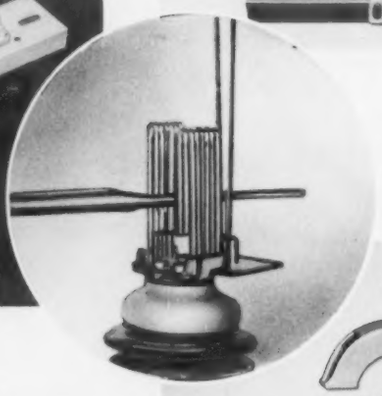


FIGURE 3

The multi-point pressure pantograph arm assures a clean wiping type contact and provides an efficient transfer of current at all times.



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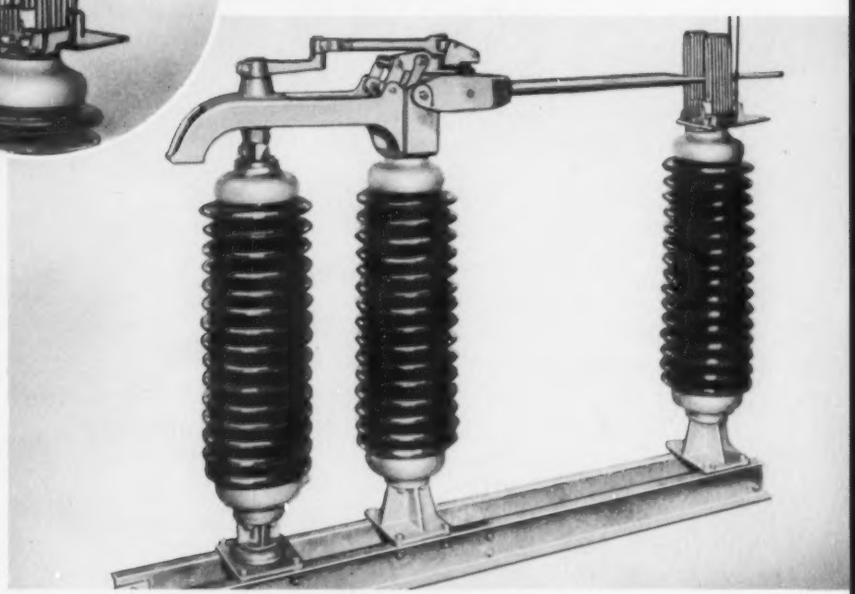
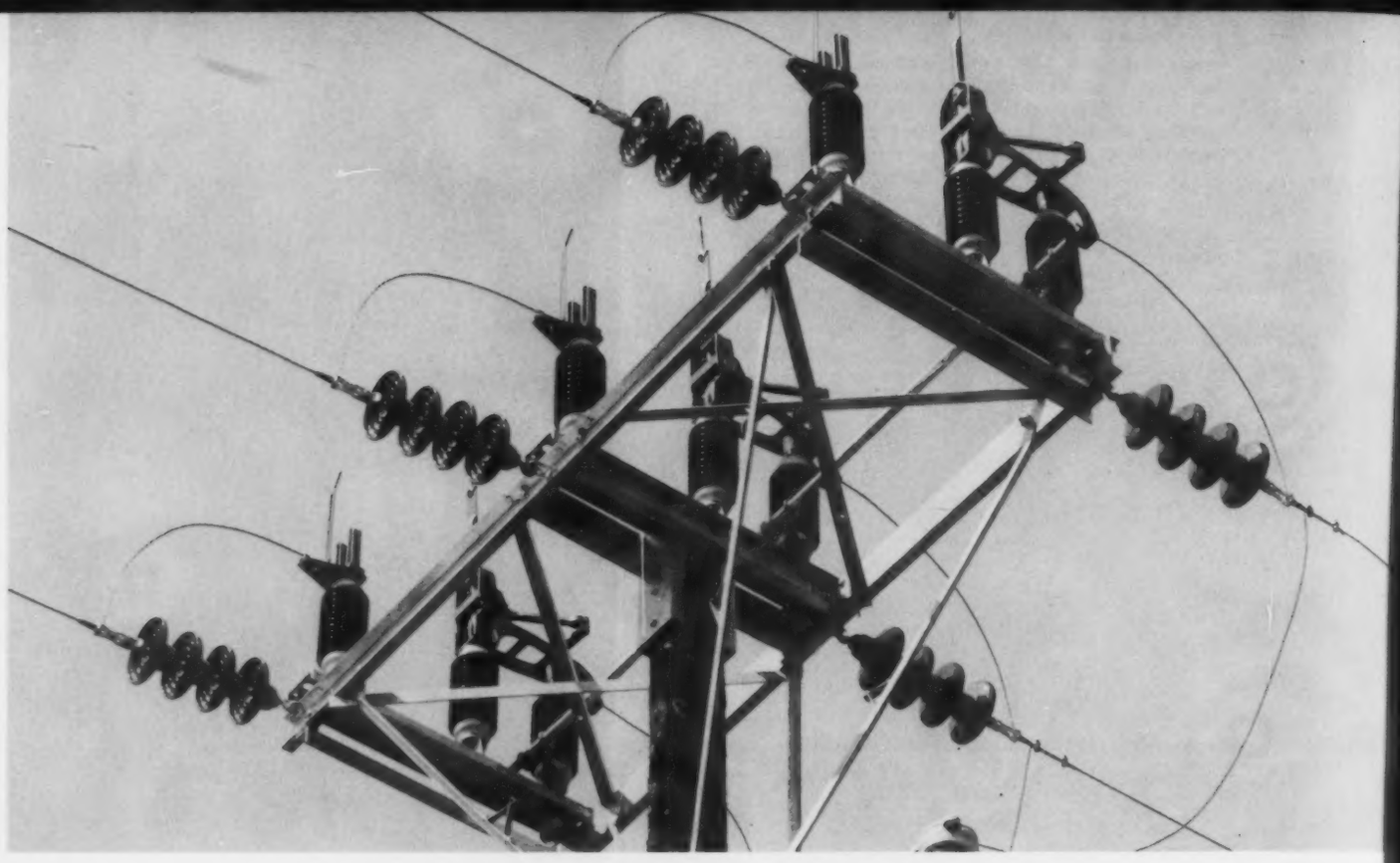


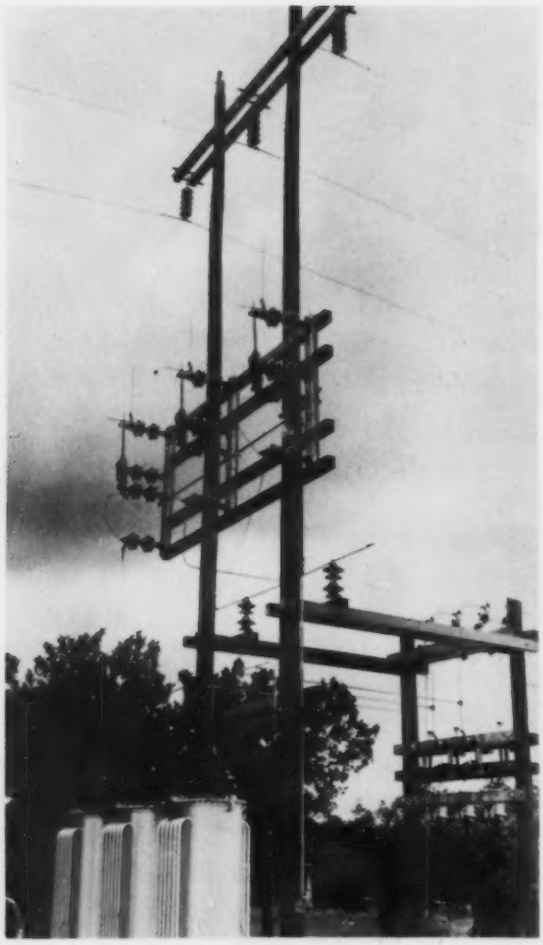
FIGURE 4

have to offer. Perhaps their experiences on other problems might help you on yours. And, there is no obligation. A Kearney representative will be glad to tell you what we can do—what we can supply . . . Or, your letter to us, will bring you full information.

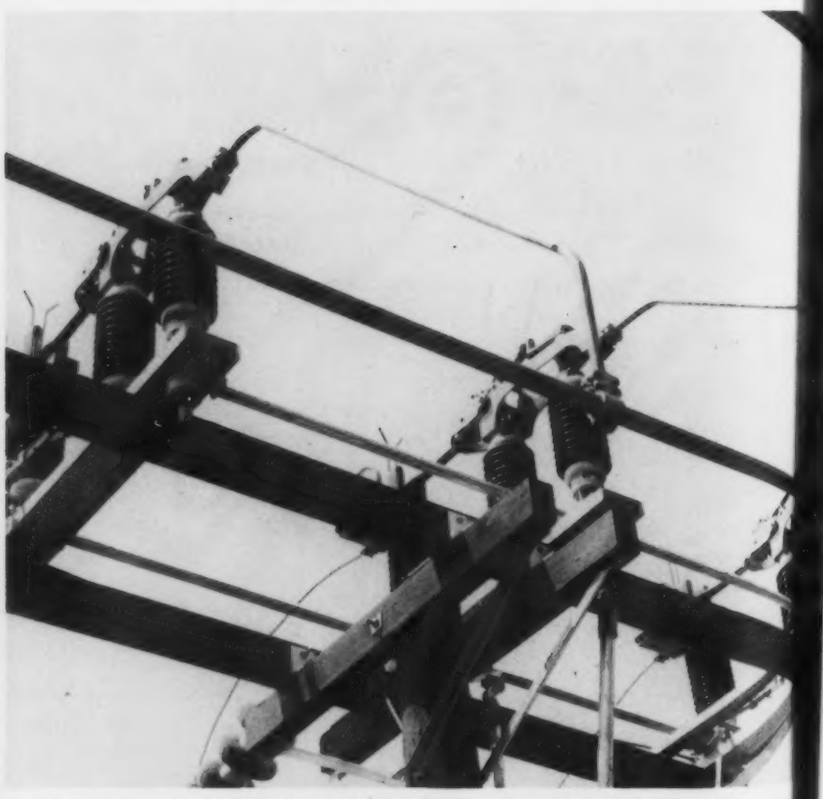
DUCTS- JAMES R. KEARNEY CORPORATION
4236 CLAYTON AVE. - ST. LOUIS, MO.
Canadian Plant • Toronto, Canada



**SUBSTATION FEEDER TAPS,** at this location, required a suitable and practical method of control. By installing a set of Kearney 34 KV vertical break Gang Switches on a single pole supported by means of a sturdy framework, as here shown, the desired advantages were obtained and a neat workmanlike job accomplished. Ease of operation and practical sleet-breaking action is obtained by a rotating movement of the switch blades before leaving the contacts.

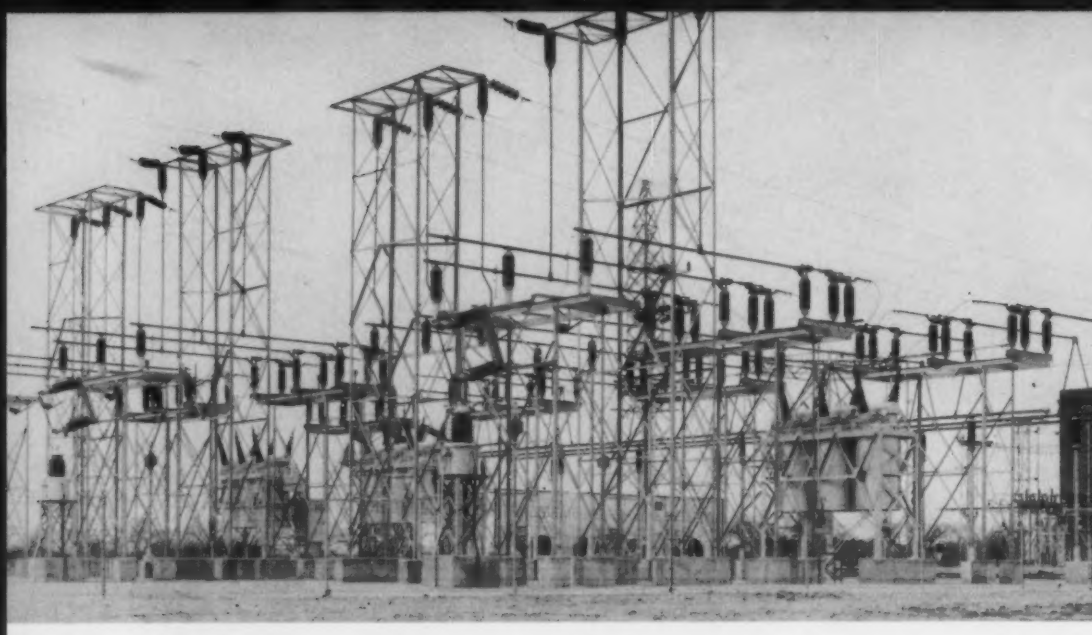


**A NEW SUBSTATION,** is here shown, built right under a transmission line, with a set of 69 KV fused Kearney Rotating Insulator Gang Operated Disconnect Switches mounted directly on the transmission structure. Secondary buses, instrument and circuit fuses are carried on a low bay attached to this practical structure.



**INTER-LOCKING GROUNDING BLADES** are something of a special, optional feature available on Kearney Rotating Insulator Gang Operated Switches. A portion of these grounding blades, which have been applied to the line side of the above construction, can be seen at the far end of the switch units. These blades can be readily attached to all ratings of Kearney Rotating Insulator Gang Switches. They have been made available at a nominal charge.

*this Page for Further Information*



**A MODERN GENERATING STATION,** is here shown, with its high tension switch structur companies are expanding their facilities to meet increasing demands for power. And, here, too, i is being used. Note that there are several sets of Kearney 69 KV vertical break Rotating Insulat

# ...SAFEGUARDING SYSTEM OPERATIONS

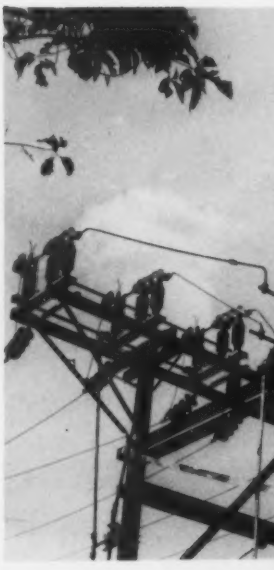
## By Installing KEARNEY GANG SWITCHES

FACED with the responsibility of keeping power flowing to stand-by plants, substations and on important lines serving vital industries, alert power company men are safeguarding their system operations by strategically installing Kearney Gang Operated Disconnect Switches.

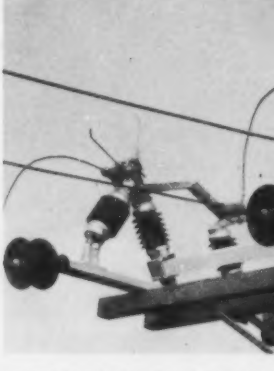
The use of two, three and four-pole gang switches is now a recognized means of facilitating greater speed and efficiency in switching, transferring, opening and closing circuits.

On these pages you see several typical installations of Kearney Gang Operated Switches. You will find in the Kearney line various types and styles of switches — rotating insulator, rocker-types, wheel types—available in ratings of 7500 volts, 400, 600 and 1200 amperes up to 115,000 volts, 600 and 1200 amperes. All of these switches have been designed for particular purposes and built to specific standards. And all of them are fully guaranteed to give dependable service and satisfactory performance in in the field.

If vital industries on your lines need protection that Kearney Gang Switches provide, talk to a Kearney Representative. He will be glad to work with you in selecting what you need to handle the problems you have. Or, if you prefer, write direct for further information and details.



**A DISTRIBUTION SU** has the high tension bus c through Kearney Gang Sw ing blades. These inter-l feature which is sometim



**ON THE POLE TO** Switches have been instal substation switching on di Multi-point pressure con

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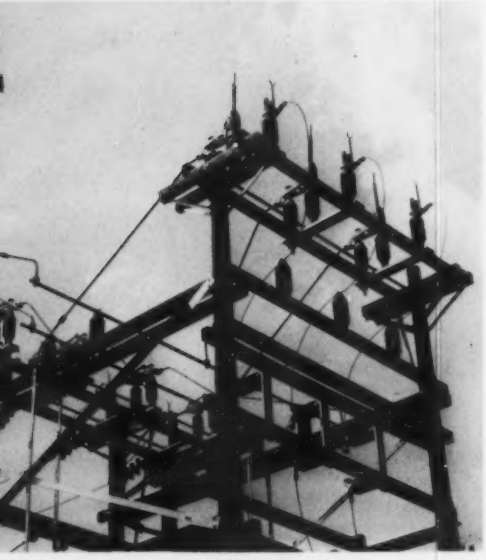
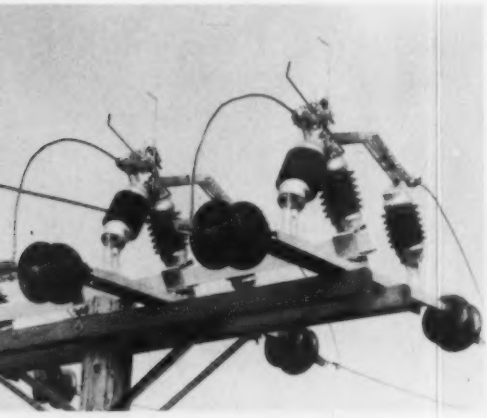
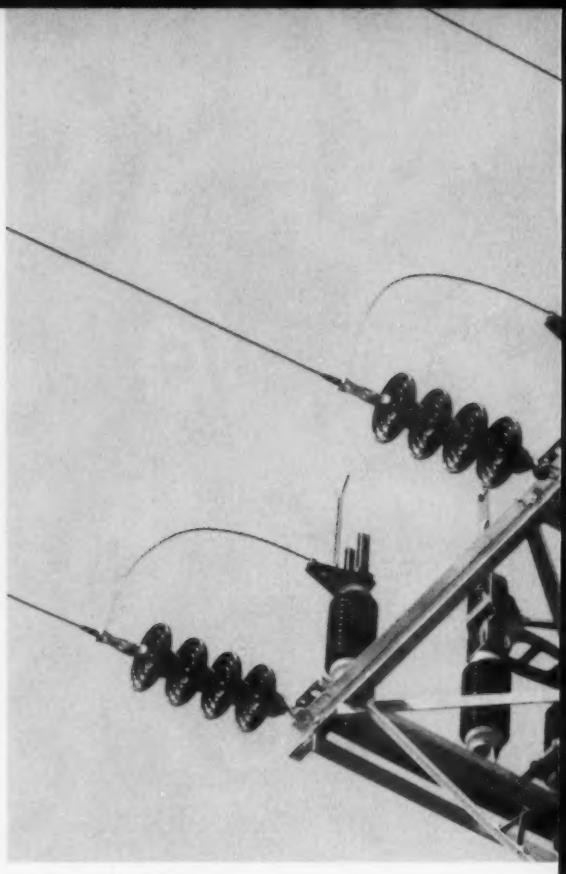
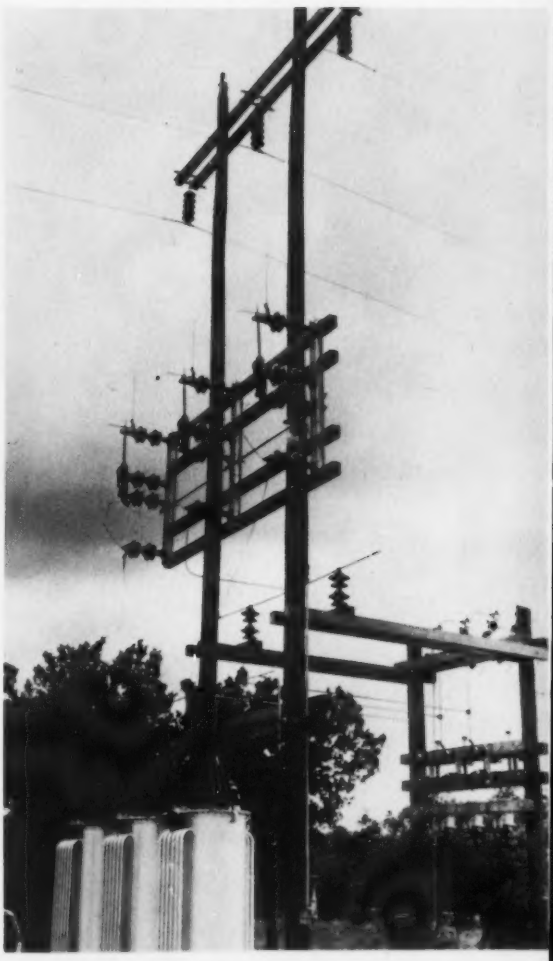


**SUBSTATION** which was recently constructed,
ous cut into a 34.5 KV transmission loop circuit
g Switches, equipped with inter-locked ground-
ter-locked grounding blades provide a special
netimes requested on constructions like this.



**TOP,** Kearney Rocker Type Gang Operated
nstalled to provide convenient sectionalizing and
on distribution and lower transmission voltages.
contacts assure positive transfer of current.





**A NEW SUBSTATION,** is here shown, built right under a transmission line, with a set of 69 KV fused Kearney Rotating Insulator Gang Operated Disconnect Switches mounted directly on the transmission structure. Secondary buses, instrument and circuit fuses are carried on a low bay attached to this practical structure.

*See Reverse Side of this Page for Further Informa*

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### Watthour Meter Protector (310)

A new indoor watthour meter protector for preventing damage from lightning surge voltages has been designed by Westinghouse Electric and Mfg. Co. The unit, which is known as type A, has a line to ground rating cutoff of 500 volts rms, a 60-cycle gap breakdown of 800 to 1200 volts rms and a discharge capacity of 20,000 amperes crest. Circuit voltage range is from 110 to 575 volts on 3-phase circuits. Consisting of an assembly of porous block elements and series gaps, the protector is enclosed in a round aluminum case filled with a non-inflammable compound. The design can be mounted on a conduit through one of the knockouts in a connection box on which the watthour meters are mounted. The nipple on the protector is 1¼ in. long and is off center to move the protector for clearance if mounted under the connection box.

### Contact Switch (311)

Delta Star Electric Co. has developed a 4000-amp. 7.5-kw. high pressure contact switch which it claims is easy to operate and secures the pressure releasing action without complicated levers or threaded studs. All current carrying parts are of hard drawn copper. The switch has high pressure silvered button-type jaw contacts and high pressure ring contacts at the hinge end of the blade. A pressure releasing device is used to release all but a slight wiping pressure before the blades start moving out of contact.

### Universal Mixablend (312)

Universal's Mixablend for 1942 includes a base within which is located a two-speed motor equipped with self lubricating ball bearings; a glass container of one quart capacity within which are six stainless steel blades; and a round bakelite cover which fits over the top of the glass and prevents splash overs during extreme agitation. The Mixablend operates on AC or DC current and is equipped with a radio interference eliminator. The specially designed Two Speed Mixablend purees foods, chops mushrooms and other vegetables, liquefies fruits and vegetables.

AND PYREX INSULATORS GIVE YOU BOTH

MORE PERFORMANCE . . . AT LOWER COST

*Save on initial cost and installation*

"PYREX" 10-in. Insulators are now 8 to 13% lower in price than competitive 10-in. units.

"PYREX" 9-in. Insulators are now 17 to 21% lower in price than competitive 10-in. units.

Stable one-price-to-all basis. Fewer than ½ as many price changes for "PYREX" Insulators as for competitive units in past 5 years.

Installation of "PYREX" strings with patented hinged crate is speedier. High M & E strength of "PYREX" Insulators usually makes double stringing unnecessary.

*Save on performance and maintenance*

"PYREX" 18,000-lb. suspension units duplicate the performance of 25,000-lb. competitive units. And in M & E tests at 25,000 lbs. and higher, 95% of breaks are in hardware, not in glass.

No "PYREX" Insulator has ever been reported to us by users as having failed from electrical causes alone.

A recent independent analysis indicates "PYREX" Insulators will eliminate ⅓ of all failures (electrical and mechanical).

SMART insulator purchasing was never more important than now! Nor so easy. For now you get two-way savings with PYREX Insulators. First, initial cost is lower. Second, the unequaled dielectric strength, high load strength, arc resistance, and weathering qualities of these borosilicate-glass insulators offer you freedom from trouble, uninterrupted service and long life. And that adds up to low long-time cost. PYREX brand Insulators do give you more performance . . . at lower cost.

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*"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works*

# Win the WAR ON WASTE

• Now is the time to wage war on waste. Food conservation—labor, fuel and energy can best be done the electric way.

Many users of Lang electric commercial cooking appliances tell us of their experiences in saving, speeding up operations and in turning out better quality meals. Lang construction assures long life and efficient operation. Lang automatic controls save time and effort of chefs.

Today, Lang is building for the army, navy and—Victory. These orders are the FIRST orders of the day. However, we can take care of our commercial customers, too.

We urge anyone considering the purchase of Lang electric equipment to plan ahead and order ahead.

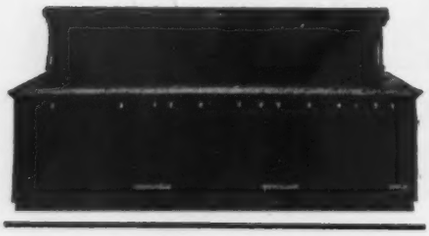
**F. S. LANG MFG. CO.**

***Portland—Seattle—Spokane***

**Builders of**

LANG

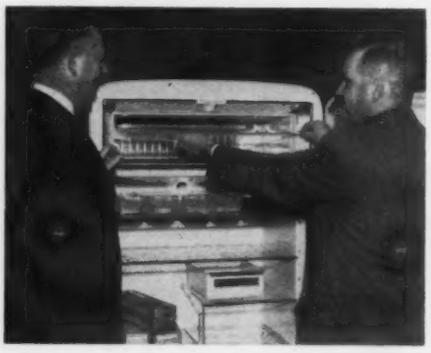
**STANDARD AND CUSTOM-BUILT HEAVY DUTY ELECTRIC RANGES, COOKING TOPS, OVENS, GRIDDLES.**




## Frigidaire (313)

The 1942 line includes five fewer models than last year. The new Cold-Walls are available in two sizes—the CD-7 in dulux or porcelain finish and the CPD-9 in porcelain only. The two-door 12½ cu. ft. 1941 Cold-Wall model is being continued practically without change.

To meet a growing demand for frozen storage facilities, the Super Freezer Chest has been redesigned to provide increased capacity—20% over last year in the CD-7 and 40% in the CPD-9. Another feature is the completely redesigned Dew-Fresh Seal for control of moisture in the cabinet.



Newly designed shelves give the Cold-Walls 16-way convertible interiors. The CPD-9 has a new sliding shelf which holds a set of uncovered square glass dishes and a basket for eggs and other small articles—a feature introduced as a result of Customer Research activities. Other features are a self-closing, self-sealing Super Freezer Chest Door; Utility Storage Bin for foods not requiring refrigeration; new location of the Cold Control; and a new dual-purpose Meat Tender.

## Magnet Wire (314)

The John A. Roebling's Sons Co. has announced the addition to its line of Roevar Magnet Wire under a Formex license agreement with General Electric Co.

According to the manufacturer, Roevar fills a definite need for an enameled magnet wire that does not require a fibrous covering and yet will withstand punishing service. It has a synthetic film of polyvinyl acetal type insulation, a new, highly improved enamel, the basis of which is Formvar resin. Maximum resistance to abrasion and solvents, high dielectric strength, high heat resistance and flexibility are qualities claimed for the product by its manufacturer.

Suggested applications of the wire are for winding on high speed automatic equipment; where relatively high operating temperatures for Class A insulation prevail, although an operating temperature of 105° C. should not be exceeded; to replace more expensive and greater space consuming fibrous insulations such as paper, cotton, silk. On installations where the properties of Roevar are needed, the manufacturer states that direct substitution for Roebling Standard Enameled and Heavy Enameled wire is possible on the basis of equivalent space factor.

## New Current Transformer (315)

Allis-Chalmers has started distributing three new types of current transformers, developed following adoption of standard primary ratings by EEI and NEMA. Conforming to the standard major dimensions in the three ratings—5 kv, 8.7 kv and 15 kv—the new units have standard base dimensions


**SMOOT-HOLMAN**

SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD CALIFORNIA

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**REFLECTORS FLOODLIGHTS**

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| 41 Post Office Place | 618 Colorado Bldg. |
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**NO SPECIAL TOOLS ARE NEEDED TO INSTALL**

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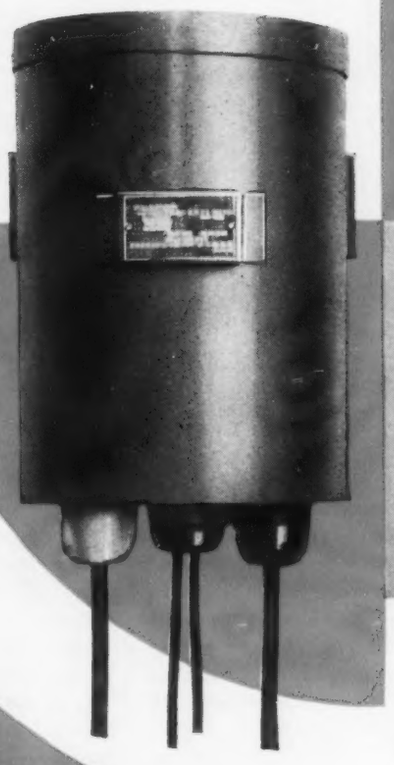
***In the West It's***

**Condon & Young, Inc.**, 357 S. Hill St., Los Angeles, Calif.
**C. E. Ingalls**, Rialto Bldg., San Francisco, Calif.
**Fred W. Carlson**, 307 Wall St., Seattle, Wash.
**Riter Engr.**, Kearns Bldg., Salt Lake City, Utah

**BURNDY** 107 EASTERN BLVD. NEW YORK CITY

# ANNOUNCING A NEW OUTDOOR POTENTIAL TRANSFORMER.

## The JE-3



**TYPE JE-3**

**For outdoor metering applications 2300 volts and below**

**INSULATION**

**230, 460, and 575 volts—full-wave, 30 kv; 2300 volts—full-wave, 60 kv**

**ACCURACY**

**¼W, ¼X, ½Y**

## NOW, G. E. OFFERS... A complete line of outdoor current and potential transformers, 15 kv and below, which conform to ASA insulation standards

These new standards, which are met by this now complete line of transformers, provide a means whereby all apparatus on a line can be co-ordinated to have the same insulation strength. This facilitates the selection of adequate protective equipment.

All these transformers meet or exceed the highest accuracy standards and can be obtained in a wide variety of mechanical constructions to meet every installation need.

Ask your G-E office for a copy of our new bulletin, GEA-3650, which covers both outdoor current and potential transformers, 15 kv and below. Or write General Electric, Schenectady, N. Y.

**GENERAL ELECTRIC**

604-6-6400

# How War Needs Affect More Than A Million Families Who Have Bought Hotpoint Electric Ranges

WINNING THE WAR is the first job of every American. And that means going without some of the things we've all taken for granted. The engineers and production experts who made more than 1,000,000 Hotpoint Electric Ranges are busy supplying Hotpoint equipment to hundreds of Army and Navy posts, as well as to cafeterias in war industry plants. While the war lasts, only a limited number of new electric ranges will be available for home use, thus releasing tons of vitally needed materials for war production.

TO EVERY family who has bought a Hotpoint Electric Range, we say—you have a durable cooking appliance. If yours is a modern Hotpoint with long-life Calrod cooking units, it should, with reasonable care, far outlast the "duration". Tests show that Calrod units are built with such durability they last for an average of fifteen years under normal kitchen use. If you *should* need replacements, they will be available.

REMEMBER, too, that the proper care of your range will help you conserve food and preserve healthful minerals and vitamins. By correct use of Hotpoint's Measured Heat, you can get the most out of your range and cooperate with Uncle Sam's nutrition and conservation programs. Unnecessary use of high heat wastes current. Study the instructions that came with your range for further suggestions about conserving food and electricity. Or write us for a free, informative booklet on this subject. Hotpoint is always glad to help you in your all-out effort to keep the American family happy, healthy and well-fed. Edison General Electric Appliance Co., Inc., 5681 W. Taylor St., Chicago, Ill.

*It's easy for users of all Hotpoint Electric Appliances to keep them in proper condition during the war emergency. Repair and replacement parts are available throughout the country if required.*

Hotpoint

ELECTRIC RANGES, REFRIGERATORS, WATER HEATERS, WASHERS, IRONERS, DISHWASHERS, DISPOSALLS, ELECTRASINKS, STEEL KITCHEN CABINETS

THIS IS the first of a series of Hotpoint advertisements in Weekly magazines, Women's publications and Home periodicals. While this is addressed to more than a million users of Hotpoint Electric Ranges, it carries an important reminder to the millions of other families who will become buyers of Hotpoint Electric Appliances when they are again available. Edison General Electric Appliance Co., Inc., 5612 W. Taylor St., Chicago.

and primary bar heights and dimensions, permitting free interchange of this equipment on all metering installations. They are built for high accuracy, high impulse strength and have uniform slotted terminals to take a wide range of connectors on the primary bars, according to the manufacturer, and are designed for heavy duty jobs and large emergency loads. Liberal core sections and large copper conductors contribute to their cool operation; circular coils withstand heavy fault currents; and an extra-cycle impregnation process seals the entire unit against damage due to moisture or industrial gases, it is claimed.

### G. E. Display (316)

A spot display which dramatizes the product and may be used on the floor or as a background has been announced by General Electric Co., Home Laundry Equipment Section. It is identical on both sides and may be converted into an illuminated display with the use of a floor lamp. The display consists of a light blue drapery supported on either side by natural finished wood standards. Identification at the top is in blue, white and gold. The display ships in a small size container, according to the manufacturer

### Commutator Cleaning Stone (317)

A new Commutator Cleaning Stone which removes excessive deposits of brush material caused by heavy power loads has been announced by the Ideal Commutator Dresser Co. This stone cleans while the motor or generator is running by simply holding it against the commutator and slowly moving across the face, the manufacturer states. It does not clog or cut the commutator, according to the announcement, and is said to clean film from the brush seats and help to reseat brushes. So called "excess color," "skin" or "film" resulting from oxidation are removed, the manufacturer claims, leaving only the "electric film" on the commutator which assures perfect commutation. In addition to helping to keep motors and generators on the job 24 hours a day, the manufacturer claims the stone will improve brush performance, reduce noise, even distribution of brush contact drop and brush wear and reduce chattering and sparking. Five sizes.

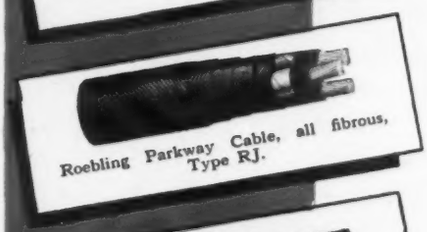

ROEBLING

*Parkway Cables*

—FOR EXTRA POWER

WITHOUT CONDUITS OR MANHOLES!

Roebling Parkway Cable with flat steel tape armor.


Roebling Parkway Cable, all fibrous, Type RJ.

Roebling Parkway Cable—Roesheath with fibrous covering.

Roebling All Rubber Roesheath Parkway Cable, without fibrous covering.

Here's a safe, easy way to extend power distribution circuits. Roebling Parkway Cables can be laid directly in a shallow trench—often only 2 feet deep.

That means the expense of conduits and manholes can be eliminated on a wide variety of underground power circuits, such as. series street lighting, parkway lighting, signal and fire alarm circuits, industrial floodlighting, airport lighting, etc.

For extra protection against impact stresses, crushing or puncture a steel tape armor is used. Recent development of a tough, moisture resistant rubber compound (Roesheath) makes available a lighter, more flexible cable that is suitable for the most severe service conditions.

These cables are available in single and multiple conductors, solid or stranded. With or without lead sheathing and metal tapes in a variety of insulations.

**OVER 60 OTHER TYPES**

of Roebling Electrical Wires and Cables are made in our mills under complete Roebling supervision and inspection—from copper bar to final reeling or spooling. They include: Power Cables, Weatherproof Wire, Bare Wire and Strand, Building Wire, Portable Cords and many others.

JR ROEBLING

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA

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# ENGINEERED SEEING
## *Goes to Work for America*

Here's Westinghouse *engineered seeing* doing a 24-hour-a-day job in one of our nation's largest aircraft plants. Eleven thousand two hundred sixty fluorescent fixtures, providing 35 footcandles of glareless light, assure quick, accurate vision for every man at every machine.

In this main factory bay, reflectors are mounted 18 feet high and each is equipped with two 100-watt fluorescent lamps. In all, there are 17,586 Westinghouse fixtures in the complete system of lighting for indoor production and outdoor protection.

Today in Cleveland our Lighting Division stands ready to supply lighting equipment for practically every phase of American war industry. You may obtain full information on this equipment from any of your 117 Westinghouse Electric Supply Company offices or independent Westinghouse lighting distributors.

# Westinghouse
LIGHTING EQUIPMENT

"Gorilla Grip" Mechanical Connectors may be quickly adapted to meet unusual requirements. Every day new "Gorilla Grip" combinations are being discovered to meet critical situations. Make-shifts are not necessary. The Terminal Units are minutely machined to fit just one conductor size, however, one Terminal Unit will precisely fit nineteen various types of lugs, taps and connector bodies. These connector bodies will take as high as nineteen different Terminal Units or wire sizes.

A "Gorilla Grip" stock set assembled for your particular need is good insurance against electrical connector breakdowns. Ask for literature.

**National Electric**
PRODUCTS CORPORATION
1300 Fulton Bldg. Pittsburgh, Pa.

# BULLETINS

*data books, etc.*

## Lightning Arresters (318)

Autovalve lightning arresters of from 3 to 15 kv. for safeguarding transmission lines and transformers are described in a 16-page bulletin issued by Westinghouse Electric and Mfg. Co. Reduction in fuse outages, high surge-carrying capacity and solderless connectors are among the features listed by the manufacturer. Isolating gap, quench gap and porous block are discussed and use in handling "hot" lighting is covered with a note on performance records. Impulse characteristics and impulse breakdown are shown by reproductions of cathode ray oscillograph records. Application to grounded and ungrounded systems is explained with wiring diagrams showing recommended connections. A cross-sectional diagram in color shows principal arrester parts and materials used and explains principles of operation.

## Ideal Catalogue (319)

A new variable speed transmission catalogue and handbook has just been published by the Ideal Commutator Dresser Co., including 52 pages of recommendations, application data, photos and engineering information. A quick index source of reference for data on Ideal variable equipment, the bulletin gives sizes, rated capacities, design and operating details. Where the equipment is applicable and how installed also is listed. The book, which took two years to compile, will be of particular interest to design and consulting engineers and to plant superintendents.

## Bull Dog Products (320)

A condensed catalogue of Bull Dog products has been released by Bull Dog Electric Products Co. This booklet contains 83 pages of equipment and five pages of tables, formulas and data. Color pages show recent developments and installations. Contents include safety switches; service equipment; lighting panels; circuit breaker panels; SAFtoFUSE panels; Kbl-Duct; Vacu-Break switchboards; miscellaneous devices. A descriptive bulletin also is available for the new Vacu-Break safety switch.

## Plant Protection (321)

"Plant Protection Begins with Floodlighting" is the title of a folder released by Goodrich Electric Co., listing the various styles of porcelain enameled floodlights available to meet various requirements. All equipment listed is in accordance with FBI specifications, the manufacturer claims.

## Switches (322)

Roller-Smith Co. presents a new 16-page catalogue listing rotary type instrument control, transfer and auxiliary switches. The switches are described and illustrated. Instrument switches, which are of the single break type, include ammeter, voltmeter, frequency meter, wattmeter, temperature indicator, power factor meter and synchronizing switches. Control switches include types for circuit breaker, motor governor speed and rheostat control. Diagrams of connections and switch developments are shown for each switch listed. In addition the faceplate markings for each switch are indicated and illustrations of all standard faceplates are shown.

## Paint Selector (323)

Of interest to plant and building superintendents is the Valdura Paint Selector issued by the American-Marietta Co. The Selector embodies two charts. Fifty-one divisions on the first chart list all types of surfaces that might be encountered in industrial, commercial and residential painting with one or more paints suitable for the application. The second chart gives properties of each paint to facilitate selection where a choice is offered by the first chart. Information includes whether the finish may be used under water or over graphite paint; maximum heat resistance in degrees F.; relative resistance to alkalies, colds, moisture, abrasion, sun and oil; coverage; and drying time. The chart also lists the most suitable thinner and primer for each type. The Selector folds to letterhead size.

## Transformers (324)

Describing and illustrating its line of control, indoor type power circuit, and signalling transformers, Jefferson Electric Co. has released an eight-page bulletin. This bulletin is sectionalized and includes complete electrical and dimensional data to assist in the selection of transformers for various applications.

## Photoelectric Relays (325)

Westinghouse Electric and Mfg. Co. has prepared a six-page booklet describing photoelectric relays, light sources and phototube housings for industrial applications and general purpose use. Electrical characteristics of relays to operate by an increase or decrease in the amount of light falling on a phototube are described in detail and rate of operation, time delay, sensitivity, static and impulse control are covered. A discussion of phototube housings includes construction, mounting, application and location recommendations. The three most widely used light sources are described and illustrated with a note on proper selection of filters. The booklet is illustrated.

ELECTRICAL WEST, 68 Post St., San Francisco, California
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Name..... Company*..... Title*.....

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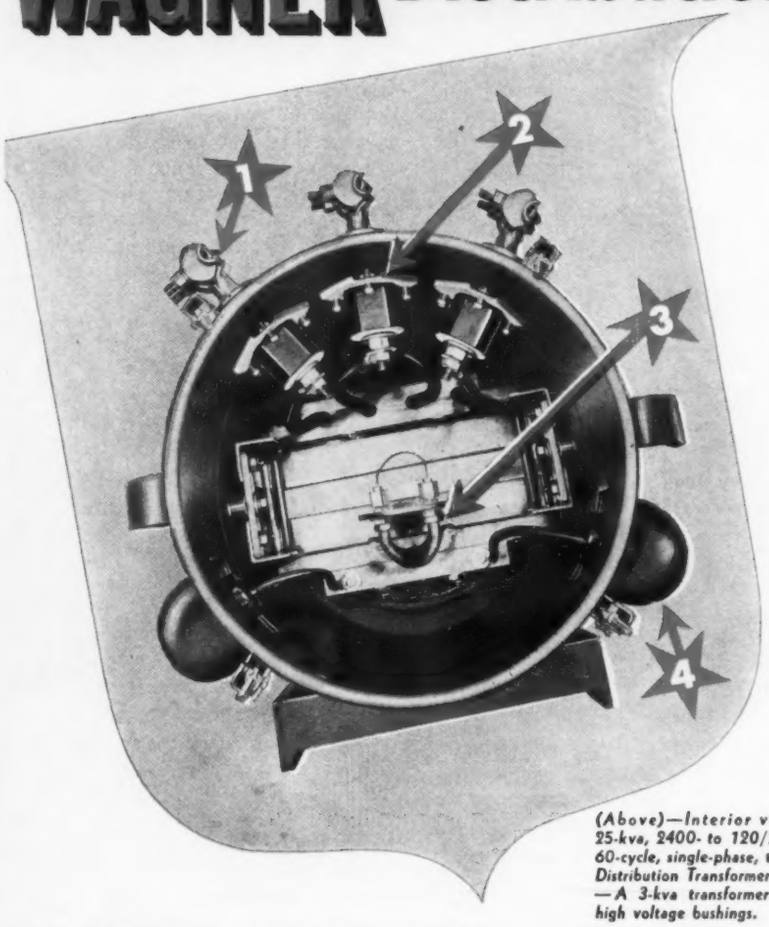
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

# Examine the Features of this WAGNER Distribution Transformer

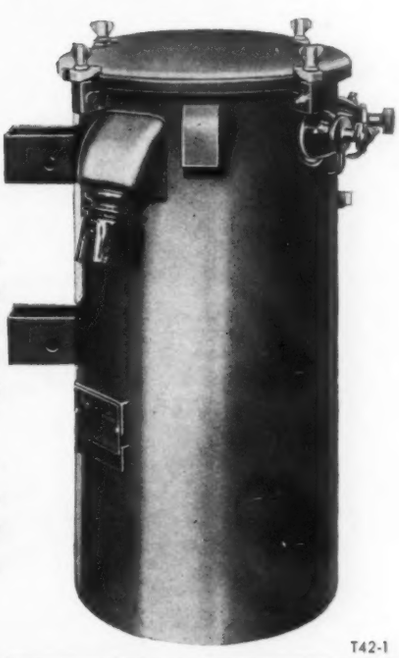



1 Solderless connectors on all bushing terminals make installation easier. The insulation level of the bushings and windings are so coordinated as to cause abnormal line surges to flash over the bushings on the outside of the tank.

2 Each bushing is of the removable type, held in place in a fixed position by means of a clamping ring assembly.

3 Disc type interchanging device consists of taps terminating in studs fastened in a bakelite disc.

4 The one-piece copper-bearing steel bushing-pocket is welded to the tank wall.



*(Above)—Interior view of a 25-kva, 2400- to 120/240-volt, 60-cycle, single-phase, type HEX Distribution Transformer. (Right) —A 3-kva transformer showing high voltage bushings.*

**The high efficiency and remarkable stamina of Wagner transformers is the result of fifty years of constant research and improvement. Every Wagner transformer built today has the full benefit of those fifty years of transformer engineering and manufacturing experience in building all types and sizes of distribution and power transformers.**

**In addition to the conventional types, Wagner makes transformers for special types of service, such as NOFLAMOL (Non-inflammable, liquid-filled) transformer and the type Y-H Constant Current Regulator for series street-lighting systems.**

**COMPLETE LITERATURE WILL BE SENT UPON REQUEST • •**

T42-1

**Wagner Electric Corporation**
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.
TRANSFORMERS • MOTORS • BRAKES • FANS

# ELECTRA'S HUSBAND

## "The Unholy Three"

"NICE IDEA, but why doesn't somebody do something about it? I was in a schoolroom the other day on PTA doings and it still had only one drop cord in the room. You men write and write about these things. But nothing is done. Are we women supposed to do it, or what?"

Electra at my request had been reading Charles Gibson's article in the January ELECTRICAL WEST. "I suspect it is because of the 'unholy three,' as Gibson called them when he gave the paper. The editors either thought that too hot to print or did not have room for his devastating remarks," I told Electra.

"Come, come, don't tease *me*," she insisted. "This is *still* a free country, so *you* can tell me what he said."

"And you won't repeat it to a soul—hardly? Well, the unholy three are the architect, the electrical engineer, and the school administrator."

"At least he did not leave himself or you out."

"No, he swept the field. 'When a school district contemplates a building program one of the first things done is to employ an architect. Just why this procedure is followed remains a mystery to many. Some feel that the task could be better turned over to the sixth grade classes. There seems to be some code of ethics which forbids the use of any idea which was not uncovered with the city of Pompeii.

" 'A conference is held with school officials, at which time they discuss such vital questions as the percentage of fee, how much money the school district has to spend, the fee, where the building is to be erected, how much money the district has to spend, how the school officials feel about whether the boys and girls toilets should face each other, and the fee.

" 'At this time a contract is signed which states specifically how many sets of plans the architects will furnish free and the time and amounts of the payments. During the next few days the architect will stroll over the site, send a request to the superintendent to have the site surveyed at district expense, and send several copies of the elevations to his office. A week or so later a line drawing showing the general building layout with a front elevation in color is received by the schoolman. The sketch of the front of the building shows trees, shrubs, lawn, and even potted plants on the steps. The background is all shaded in and not even a power pole is allowed to mar the perspective. The first thing one sees when he looks at this work of art is the architect's name sprawled out in two-toned letters of gold and green.

" 'From there on the architect works in utmost secrecy. The point of pride seems to be how little information about what the buildings are to be used for they can get along with If the superintendent requests some particular feature, it is generally received with a patronizing air of humoring the customer. Ten to one it will never show in the plans.

" 'Bids are prepared and estimates compiled. When opened one understands at once why they contained so many alternates. The lowest turns out to be 20% higher than the architect's estimate. Something has to be cut. What are the unessentials? The health unit that was to provide the medical, dental and general nursing—that can be built later. Those venetian blinds can be replaced with roller shades. One coat of dark stain can take the place of several pastel shades of woodwork paint. And, ah yes, here—on the very last page of the plans is the electrical layout. Here he can shave $5,000. Of course the room will have only two enclosing globes but the sun shines most of the time. Besides that will cut down operating and maintenance costs too. Now he can have solid brass butts on the doors.

" 'The electrical engineer is almost as bad. In some respects his sins are even greater. The science of illumination is a comparatively new one. There are no centuries of precedent in techniques to beat back. In fact, the men engaged in the field of illumination pride themselves that their formulas and specifications are based on recent and exhaustive research carried on in excellently equipped laboratories. Their motives are modern. But to quote directly from a booklet put out by one, titled, *Illumination Design Data*, "Every designer should approach lighting problems not alone from the standpoint of present practice but should try to extrapolate or project his viewpoint along the trend curve of future progress." That word *extrapolate* illustrates my point. The greatest fault of the electrical engineer is that he talks in riddles. When a superintendent of schools makes an appointment to talk lighting with an electrical engineer, he gets out his thesaurus, dictionary, and a few other reference books. He is bombarded with lamp lumens, coefficients of utilization, watts, volts, footcandles, reflection factors, maintenance factors and all the rest of his scientific verbiage. You talk in your own terms, and although your vocabulary is correct, it has no meaning to us. Words minus meaning equal electrical engineer.' "

"What I have always said," came from Electra.

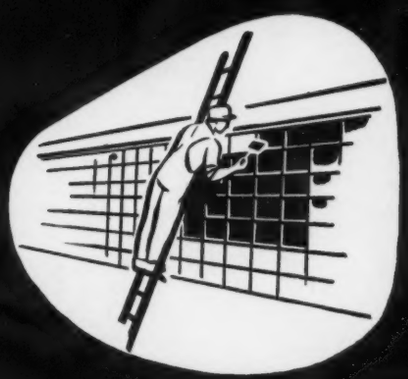
" 'We have left the worst group till the last,' Gibson went on. 'If we add up all the faults of the architect and multiply them by the errors of the electrical engineers, the product would be school administrators. To enumerate their faults would take too long. Let us be kind enough just to summarize their particular weaknesses in relation to our problem.

" 'Change involving new ideas meets with even sterner resistance than that offered by architects. Cost in terms of budgeted dollars is the rudder by which their ship of life is steered. Economy, as measured by the outmoded standards of administrative success, is an obsession. Advice offered by someone who has something to sell is looked upon as being motivated by selfish desire. The business world as a whole is quite far removed from his cloistered retreat and he is generally quite suspicious of anyone who intrudes from this outside world. A set of plans or an electrical layout look like pages from a book of Greek and yet he is too smug to admit his technical ignorance and ask questions. He strokes his chin wisely, nods his head, grunts, and when cornered, retreats ungraciously to his position behind his dignity.

" 'The school room lighting that has resulted from the childish smugness of the architects, the unintelligible jargon of the electrical engineer and the appalling ignorance of the school administrator is an almost unbelievable masterpiece of failure.'

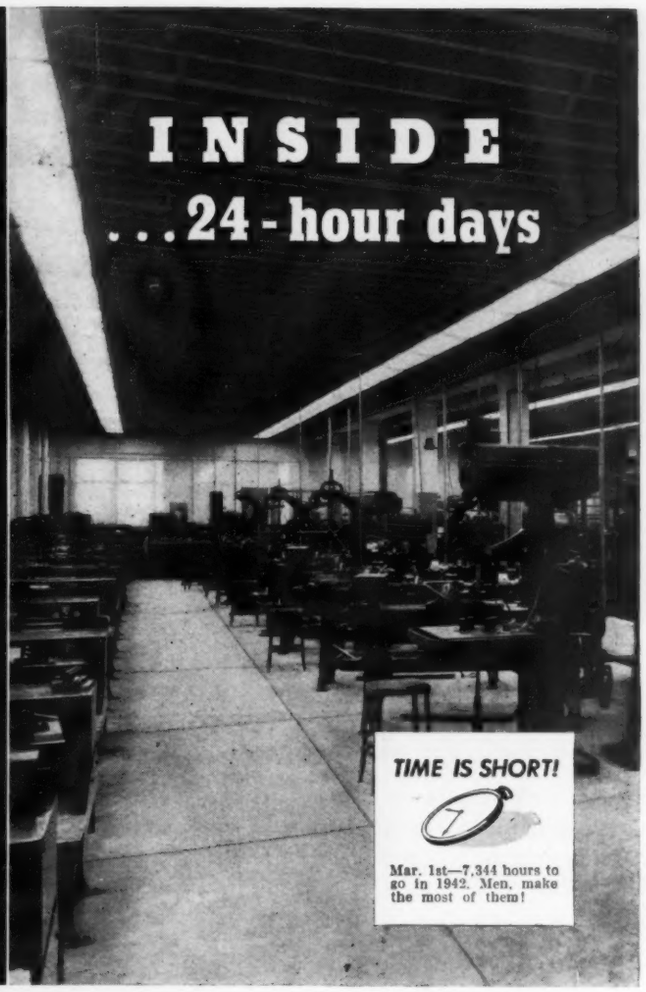
"I imagine, Electra, that's your answer."

# OUTSIDE ...24-hour nights



Help industrial plants prepare for the blackout. Let the MILLER Continuous Wireway Fluorescent Lighting System help you help them...with 50 foot candles or better of 24-hour working daylight.

# INSIDE ...24-hour days




THE industrial West Coast is blacking-out. Strategic plants in the East are reported ready to follow suit. How far will the blackout go?

Plants that were perfectly geared to natural daylight must now operate on 24-hour nights. What about *precision* work? What about *inspection?* What about *preferred* "window-side" locations? The brush is blacking-out all natural daylight.

Regardless of where the blackout hits or doesn't hit—don't let industry work its men by moonlight. Recommend and urge MILLER 50 FOOT CANDLER or 100 FOOT CANDLER for all factory areas — MILLER TROFFERS for offices, drafting rooms and similar locations. Sell industry the insurance of 50 foot candles or better of man-made working daylight, 24 hours a day. *Wire for details.* (Representatives in principal cities.)

**Get these 5 MILLER Fluorescent Lighting Benefits**

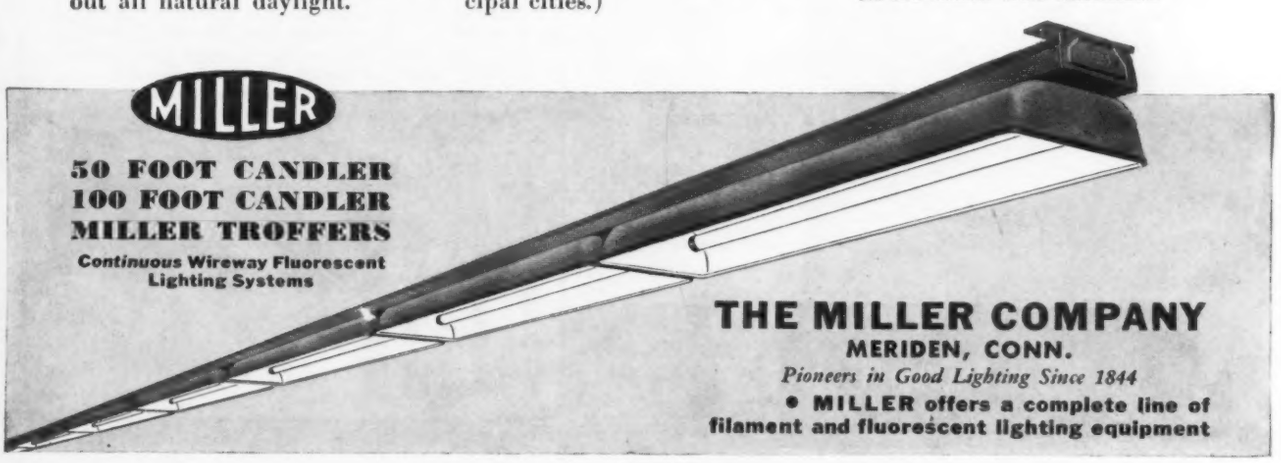
**HIGHER ILLUMINATION** . . . 50 to 100 foot candles—with uniform light distribution.

**30 TO 50% LOWER INSTALLATION COSTS** . . . Make war production dollars go further.

**FASTER INSTALLATION**... Steps up building schedules—plants get into production quicker.

**SIMPLIFIED MAINTENANCE**... Easy-to-clean, removable porcelain-enamel reflectors — save man-hours for production.

**ALLOWANCE FOR FUTURE LIGHTING NEEDS** . . . illumination can be increased 45% without new fixtures—lower obsolescence.



MILLER

**50 FOOT CANDLER**
**100 FOOT CANDLER**
**MILLER TROFFERS**

**Continuous Wireway Fluorescent Lighting Systems**

**THE MILLER COMPANY**
**MERIDEN, CONN.**
*Pioneers in Good Lighting Since 1844*

**• MILLER offers a complete line of filament and fluorescent lighting equipment**

# G-E Wiring Materials Distributors All Over the Country

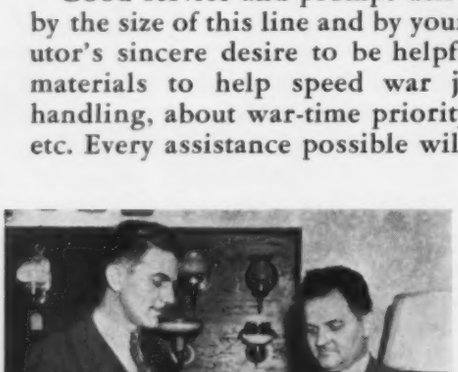
## OFFER HELP ON WAR PROJECTS

**The G-E Wiring Materials Distributor in your territory is eager to co-operate with you in forwarding U.S. war efforts. His representatives can help with ideas and suggestions gained from long experience.**

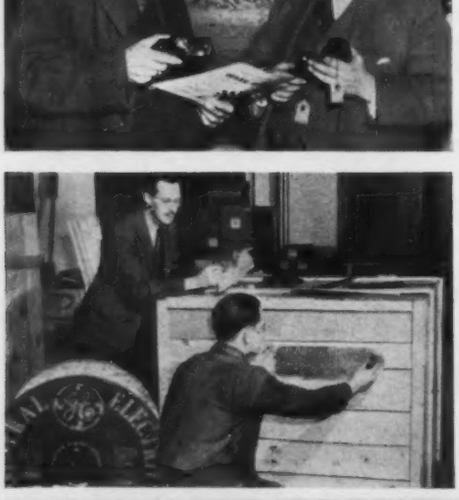
***The variety and bigness of the line your G-E Wiring Materials Distributor handles assures suitable materials for war jobs.*** **The line includes black and white conduit, boxes and fittings, wire and cable and wiring devices. These products are all high quality.**

**Good service and prompt delivery are aided by the size of this line and by your G-E Distributor's sincere desire to be helpful. Ask about materials to help speed war jobs you are handling, about war-time priority procedures, etc. Every assistance possible will be given.**

Close co-operation was given by the General Electric Supply Corporation, Chicago, Illinois, when supplying wiring materials for a new plant constructed by an automotive manufacturer for war production. The electrical contractor was the Associated Electric Construction Company, composed of the Fries-Walters Co., the Kelso-Burnett Electric Co., the Harmon Electric Co. and the United Electrical Construction Co., all of Chicago. In the photograph Fred W. Schustedt, salesman, G-E Supply Corporation is discussing with contractors the floor outlets for the Fiberduct underfloor raceway system installed. Left to right: Mr. Schustedt; W. P. Pietsch, superintendent; J. R. Strom, engineer; H. L. Winograd, assistant purchasing agent; John F. Adamson, assistant works manager.



When R. A. Schaeffer (right) of the Schaeffer Electric Construction Co., Reading, Pa., needed surface wiring materials for speedy installation in temporary war-time buildings, he asked C. J. Clay, salesman for the Reading General Electric Supply Corporation house, for assistance. Mr. Clay helped him select suitable available materials.

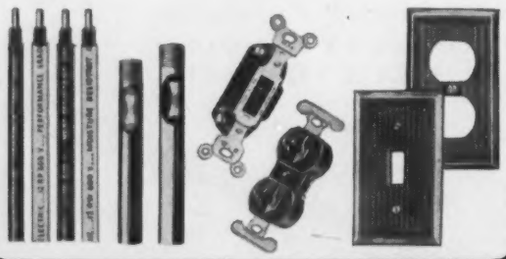


E. B. Latham and Co., New York, N. Y., has provided wiring materials for several U.S. naval and army bases in foreign locations. Here A. B. Steinheuser (left), manager of the foreign department is checking a shipment to the U.S. Naval Air Station, Trinidad, B.W.I. B. Lonczak, chief packer in foreign department is stencilling the address.

"Sell with a sample" is the plan used by Carl Rosser and Jerry Alexander, salesmen for Hendrie and Bolthoff Mfg. & Supply Co., Denver, Colorado. Samples of products are carried that will be particularly interesting to customers. Mr. Rosser helps his customers lay out lighting and wiring jobs of all sizes.

### SEE YOUR G-E DISTRIBUTOR

***The nearest G-E Wiring Materials Distributor will be glad to give you information about G-E conduits, wires and cables and wiring devices. He'll help you select materials particularly fitted to your war-time needs. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Connecticut.***



GENERAL ELECTRIC

ELECTRICAL WEST

MARCH, 1942
VOL. 88 NO. 3

# Blackout Lighting Control

**Who shall control outdoor lighting and how it shall be controlled are problems facing electrical industry and civil defense agencies; there are a variety of methods of light control that will make blackouts effective and still retain multiple advantages of outdoor illumination**

REDUCTION in outdoor lighting in the cities up and down the Pacific Coast due to the constant threat of blackouts, presents a problem both to the electrical industry, and to all others who benefit from the positive advantages of exterior illumination. There are a variety of solutions open to those who are vitally interested in this problem, and some of those of most general application are worthy of study with particular reference to the advantages and disadvantages of each.

Any discussion of the methods of control of exterior lighting that would permit illumination at all times except during actual blackouts should be prefaced by consideration of the various parties involved and the degree of interest each has in the subject—either in total blackout or in maintenance of illumination. The Office of Civilian Defense is entrusted with the highly important problem of maintaining civilian morale during war conditions, and particularly in those districts designated as combat areas. Many in authority hold that morale is maintained easiest when life is conducted in all of its phases as nearly normally as possible. One of the many factors in producing the appearance of normalcy is outdoor lighting. Floodlighting of buildings, lighting of show windows, street lights and illuminated advertising signs all play their part in re-assuring the civilian population.

From a monetary standpoint the groups first and most seriously affected are the outdoor advertising companies and sign manufacturers. Much of their revenue comes from signs which are illuminated after nightfall. The electric utilities, both private and municipal, suffer a sharp loss in attractive revenue. Their losses are directly measurable. An intangible, but nevertheless very definite loss, falls upon stores, merchants and other establishments which utilize illuminated signs and show windows. There has been demonstrated time and again through the years that the value of both mediums in promoting business is real. With the present day necessity of educating people to the use of substitute materials in their personal buying, the value of this type of advertising increases.

Manufacturers of control equipment have a natural interest in this problem, as a number of the solutions involve devices which they market.

Municipal groups, such as electrical inspectors and electrical departments, must be assured that whatever control scheme is used is in accordance with local ordinances and practices. The army and the Office of Civilian Defense must be convinced that whatever scheme or schemes are adopted are reliable and will in no way interfere with blackouts when the alert is sounded.

These then are the groups who, along with the general public, have a direct or indirect interest in this subject. Any solution must offer real benefits to them. Before any of the solutions are adopted by the group who will make the installation, approval should be secured for the installation of the control devices necessary for the functioning of the scheme.

Authority for granting such approvals varies from community to community. In San Francisco it is vested in Ralph Wiley, chief of the Department of Electricity. In Los Angeles County, the sheriff has such authority. In some of the Northwest cities, the police department says which lights may or may not burn and just what type of control is approved. In some cases the army acts as advisor. To date there is considerable lack of uniformity in rules and interpretations and also in the definition of what constitutes satisfactory light control. However, it is hoped that time and experience will correct this situation. Obviously no outdoor advertising company nor anyone else would invest money in one or more control schemes without definite assurance that the method of control would be satisfactory to whatever body had authority over blackouts.

Six general types of control have been suggested, and some of them are already in operation to a limited extent. It is understandable that no one scheme is universally applicable, and that the solution of the broad problem in a certain area may involve part or all of the systems which are outlined in the following paragraphs.

The most obvious solution is the use of a manually-operated switch in the lighting circuit. This might be operated either by a member of the police force, air raid warden, or some authorized attendant. It might be a push button connected in the main contactor circuit or a manual switch in the main lighting circuit. The principal advantages of this scheme are low first cost, few materials required, little chance of maintenance expense and simple installation. Its disadvantages are that there is no positive assurance that the lights will be turned out within the necessary time after sounding of a blackout alarm. In remote locations it would be very difficult for an attendant to reach the sign within the specified time. As it requires an operator physically to come to the location of the switch, it would require a number of operators in those areas where exterior lighting is quite generally used. To insure that saboteurs or enemy agents do not turn on such lights during the blackout, some provision must be made so that when the switch is turned off it cannot be turned on again except by an authorized person.

A form of control actuated by the current flowing in street lighting circuits is feasible. The equipment to ac-

**Photo-electric relay focused on a light source already under control is an effective method of blacking out signs and other outdoor lighting. The device can be mounted and focused on a street light (left); its interior workings are simple and positive. Its use has been approved**

complish this consists either of an insulating transformer and relay which is energized all of the time that the street lighting circuit is energized or a high voltage relay connected directly into the street lighting circuit. In addition to these devices, considerable wiring may be required and, if the street lighting is in an underground circuit, the cost of tearing up and replacing pavement will be a considerable item. Either of these arrangements has the advantage of simplicity of equipment and freedom from maintenance. In addition, they would be actuated from a source definitely controlled at the time of blackout. The principal disadvantage to this method of control lies in the fact that there would be a physical interconnection between the utilities' street lighting circuit and the consumer's secondary circuit. In addition, the cost of installation would generally be quite high.

In the case where the high voltage relay is connected directly into the street lighting circuit, there is the potential hazard of high voltage getting through to the lighting circuit by accident.

Control by light from street lights or other light source now under blackout control is entirely feasible and practical. Photo-electric relays mounted either on the sign itself or on an electrolier or power pole will open the lighting circuit upon blackout of the controlled light source. This scheme has the advantage that there is no physical or electrical connection between the controlling source and the lighting circuit. It is positive in operation under all conditions, and in the event of tube failure, the lighting circuit will be blacked out. The overall installed cost will compare favorably with that of the second system described. The photo tube can easily be shielded so that extraneous light will not give improper operation. The principal disadvantage is that it can be applied only where a strong enough light source is within the range of dependable operation. This varies with the type of photo-electric relay and with the possibility of dense fogs or other adverse conditions which would cut down the effective light reaching the photo tube.

In those instances where the photo-electric relay is mounted on the electrolier or power pole, its wiring to the lighting which it controls may be costly, complicated, or require special approval. This point must be checked with responsible groups before an installation is made.

Carrier current control super-imposed on existing distribution circuits is positive in operation and tamper free. This type of control, however, is high in first cost and is only justified in those instances where other functions of the control such as water heating or normal street lighting will justify the cost.

Control from the basic carrier wave from local broadcasting stations offers possibilities. The equipment might consist of a simplified radio receiver tuned to the correct frequency, and a contactor of sufficient capacity to handle the lighting load. This method of control has wide application. The lighting load to be controlled does not need to be near street lighting circuits and an attendant or operator is, of course, not needed to blackout the light. The cost would be moderate, and there is, of course, no physical or electrical connection with high voltage circuits. There is a definite danger, however, of faulty operation from radio interference unless a lockout feature is provided which will add considerably to the cost. Theft of tubes and equipment is a definite possibility that must be considered in its application.

A separate control circuit is another possible means of blackout lighting control. Its advantages would be that it would be tamper-proof and positive in operation, but it would have a high cost and very limited application. Undoubtedly local ordinances would be affected which should be carefully investigated before application is made.

A certain amount of material is required in each of these control schemes. The question of securing priorities for the acquisition of this material has not been settled. One viewpoint, of course, is that such exterior lighting is non-essential, and therefore scarce materials should not be used in controlling it. The other and more realistic viewpoint, is that exterior lighting is one of the means of promoting civilian morale, and in consequence the relatively slight amount of material needed to maintain this lighting in operation is justified. On this basis, the necessary priorities might be obtainable. There is naturally a very definite reluctance on the part of outdoor advertising people and others who would purchase this control equipment to invest any money until they are definitely assured by the proper parties that the plan which they are contemplating is satisfactory to the proper authorities.

This discussion of the control of exterior lighting during blackout periods has outlined some of the methods of control which have been proposed, and related this general subject to the various groups interested in its continuance. The problem exists and the ingenuity and initiative of the electrical industry are challenged in reaching approved solutions which will quickly bring back to all interested parties those benefits which result from exterior lighting.

# Systems Inter-Tied for Energy Exchange

**Southern California Edison and San Diego Gas & Electric systems are interconnected through a 50,00-kw. frequency changer that can be later converted into two condensers; lines employ duplicate relaying**

ASSURANCE of ample supplies of electric power for all purposes both normally and in emergencies is doubly certain in the case of Pacific Coast utility systems because of the degree to which facilities are interconnected. Among the most recent noteworthy interconnections is that between the San Diego Gas & Electric system and the Southern California Edison Co. over 100 miles of new 132-kv. line between the Chino and Mission substations. The inter-tie is supplemental to other inter-connections. Placed in full operation last August, when a unique 50,000-kva. frequency changer was ready for operation, the line had been supplying power for eight months prior to that time through joint facilities of Edison, the California Electric Power Co., the Los Angeles Bureau of Power & Light and the San Diego company. The agreement by which this emergency operation was accomplished is typical of the cooperative operations of far Western utility systems.

Negotiations for the interconnection date back to 1939 when defense activities in the San Diego area began to step up. Under the terms of the operating companies, Edison maintains a standby capacity of 37,000 kw. for San Diego through a frequency changer at its Chino substation. Kilowatt-hours may be exchanged in either direction and are designated as demand or surplus energy, based on a delivery point and meters at Chino substation.

Previous to the installation of the Chino frequency changer, power was delivered to San Diego from a tap to the California Electric Power Co.'s 115-kv. line from San Bernardino which interconnects with the system of the Los Angeles Bureau of Power & Light at Seal Beach and passes within a few miles of Chino substation. This power delivery was made through interim agreements between the companies which was effective for about one year from the time the interconnection was completed in December, 1940.

The frequency changer was first operated in August of 1941. The 115-kv. connection to the California Electric Power Co. and the Los Angeles Bureau of Power & Light was left available for use as an emergency interconnection after the completion of the frequency changer.

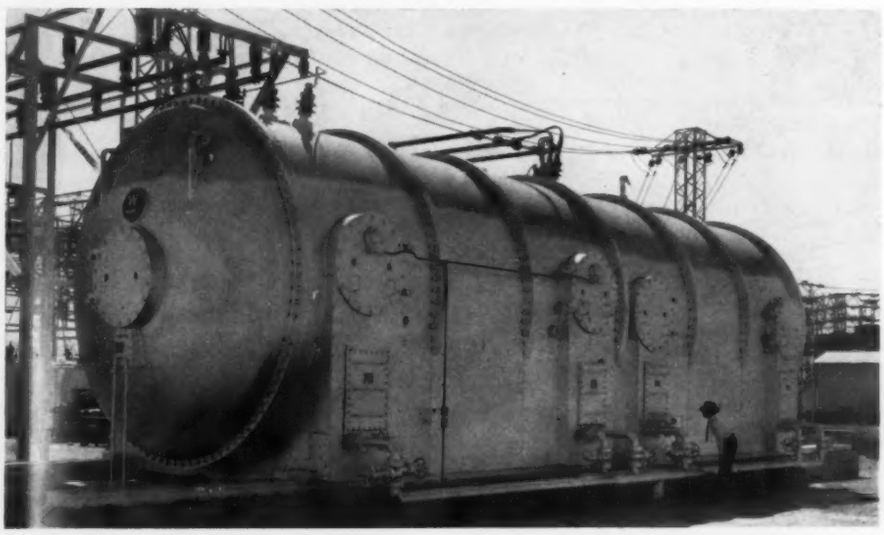
One-half of the Chino frequency changer was installed in 1939 as a ten-pole 50,000-kva. synchronous condenser. The machine was designed to permit operation as a motor or generator. The increased interchange capacity was obtained by adding a twelve-pole synchronous machine to the condenser, thus converting it to a frequency changer. The machine is hydrogen-cooled. The 10-pole/12-pole arrangement takes care of the difference in frequencies—50 cycles in the case of Edison and 60 for San Diego.

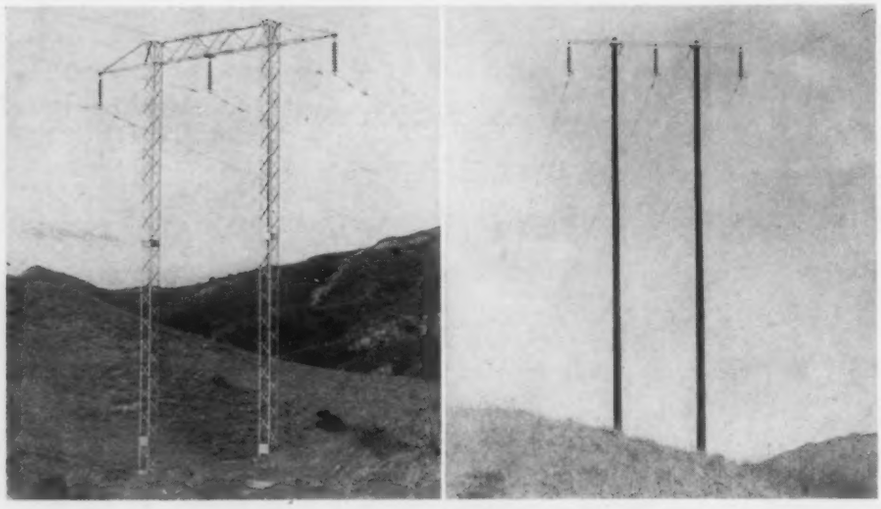
When the foundation and bedplates were designed for the frequency changer, allowance was made to permit future operation as two synchronous condensers. If at any time the frequency changer is no longer required and two condensers are required at Chino, the two halves of the frequency changer will be separated and end bells installed to obtain two hydrogen-cooled condensers.

The 35-mi. section of line from Edison's substations is carried on 35 steel towers, 81 steel "H" frame and 41 wood "H" frame structures depending upon the character of the terrain. Conductor configuration is horizontal in each case with 17-ft. spacing on the standard towers, 24-ft. on the steel and 15 ft. on the wooden "H" frames. Conductor is 397,500 circ. mil ACSR with 26 aluminum and 7 steel strands. Ground wires are 5/16 in. bethanized steel. All structures are equipped with saw tooth bird guards.

The 63.2-mi. section built by the San Diego utility from Capistrano to Mission substation is carried on five steel towers and 438 wood "H" frame structures. All except nine angle structures are two-pole creosoted Douglas fir with double cross arms. Three-pole structures are used at angles. Conductors are 250,000 circ. mil, 19-strand hard drawn copper supported in horizontal configuration. Ten-unit standard suspension insulator strings are used except for eight miles of line near Oceanside where eight fog type units are used in a string. Average span length is 760 ft. with a minimum of 180 ft. and a maximum of

**This 50,000-kw., 50/60-cycle hydrogen-cooled frequency changer consists of a 10-pole synchronous condenser at the right end, driving a 12-pole condenser operating as a generator at the left. When future conditions dictate, the two units can be separated and each operated as a condenser by simply installing two new end bells**





**Types of structures on the tie line include (left) steel "H" frame and (right) wooden "H" frame. Both are on the Edison section of line. Wood frame construction predominates in San Diego**

1,800 ft. Because of termite activity in this region, all poles, timbers, cross arms, spacer blocks, braces and pole anchors were pressure creosote treated by the standard empty-cell process.

Rugged country made construction difficulty. Plans were laid out after airplane trips over the proposed route. In many places grades were so steep that trucks hauling materials were towed by tractors. In other places mules were used to get materials to the site of some structures. Most pole holes were machine dug, except for rocky positions on some of the mesas. Digging crews were followed by framing crews, who assembled the structures on the ground. The double cross arms—fully assembled—were spread by a special tool and slipped over the top of the two poles, and bolted into place. After insulator strings and bird guards were attached the structures were lifted into place by erector crews. A tractor equipped with an 80-ft. gin pole was used in erecting. A plumbing and tamping gang followed and a wire stringing crew was last with successive groups putting the wires in place, pulling up to the proper tension and finally clipping the conductors to the insulator strings and removing the pulling sheaves. Insulator strings were bonded with No. 6 copper wire at each structure to prevent leakage from burning the cross arms.

Relay protection includes duplicate relays installed on the line at Chino sub. One group, known as upper, and the other group, designated as lower, are transferred by use of a roto-switch. Such arrangement permits testing at any time without line switching and allows for two values of relay settings. Instantaneous phase and ground protection are provided by using an instantaneous relay having four elements. Each of three elements connects to the phase CT secondaries, and their setting is determined by out-of-step current values. The ground element is connected to trip on zero sequence current.

A negative sequence relay is connected to protect against phase-to-phase faults. This relay has three elements mounted in one case having their trip circuits connected in parallel. Each element has a restraining and an operating coil. "A" phase operating coil opposes "B" phase restraining coil; "B" phase operating coil opposes "C" phase restraining coil, and "C" operating coil opposes "A" phase restraining coil.

In each group there is also connected a high speed overload relay to operate on zero sequence faults. This relay has a time element and is used to protect against high resistance ground faults.

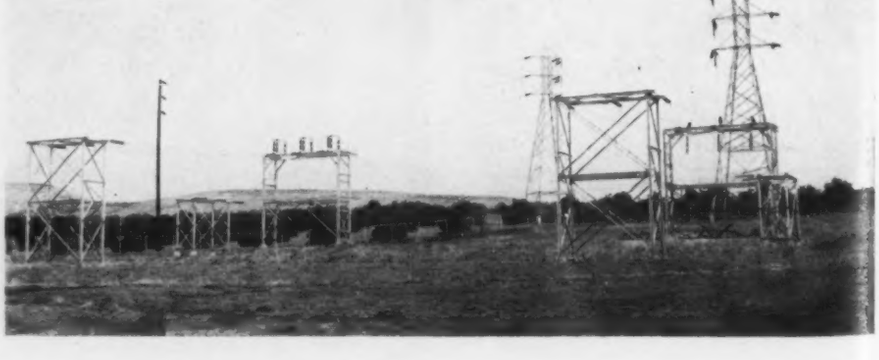
Synchronizing connections at Chino are made between the line and bus by means of a capacitor coupling device. The condenser coupling has .002 microfarads and has a 1½-kva., 25-volt, 7,200/240-volt transformer connected in series to ground. Phase angle correction is made by using phase-shifting transformers connected to the secondaries of the bus potential transformers. The synchronizing panel consists of an incoming line voltmeter and frequency meter, a running bus voltmeter and the synchroscope. A similar synchronizing coupling capacitor and voltmeter is connected to the line available for emergency feed.

Telephone communication between Chino and Mission stations is established by the use of a double frequency duplex carrier current system. The same coupling capacitor used for synchronizing is used to couple the output tuning unit to the line. At Chino, the transmission speech is carried at 55 kc. and the receiver at Mission is tuned to 55 kc. At Mission, the transmitter is set at 95 kc. and the receiver at Chino is set at 95 kc. Only one coupling device is used at each end of the line. This device is connected from "B" phase to ground. The wave trap between the coupler and the bus consists of a double trap, one for each frequency.

The telephone equipment is standard and the wires from the tuning units are brought to the station operator's or dispatcher's desk where the carrier phone may be connected to the company's telephone system as desired. Operation to date has been very satisfactory and the voice is received at a very good quality level. Having the double frequency allows the listener to break in on a conversation at any time which may save valuable time during switching procedure. This scheme also eliminates starting relays, which have a tendency to break up words unless perfect adjustment is maintained when using a simplex system.

Since its initial operation the line has functioned successfully, carrying loads up to the maximum capacity of the frequency charger.

**Tie-point where the San Diego lines (right) interconnect with the Edison lines (left). Steel structures are used adjacent to the various substations**



# Coordinated Fusing Plus Spill Gaps Give Service Continuity

**Idaho Power Co. distribution feeders protected against lightning and other faults by low-cost system of coordinated main and branch line fuses with spill gaps installed at all transformer locations**

*By C. N. Teed and J. F. Servis*

Idaho Power Co., Boise

IMPROVEMENT of service continuity is an ever-present problem to electric utilities. More extensive interconnection of generating facilities has improved the reliability of power supply, but the distribution system has continued to be vulnerable to the hazards of lightning, windstorms, birds and automobile accidents. During the past two years a method of improving the service continuity has been applied to several representative Idaho Power 12.5-kv. distribution feeders. This method involves the installation of main line and branch line fuses which are coordinated not only with each other but also with the substation feeder switch, and further includes the installation of spill gaps at all transformer locations. The scheme may be applied to all distribution feeders in those voltage ranges above 5 kv.

For many years this company has made a practice of summarizing the causes and direct costs of all distribution line outages. In 1931 after careful analysis, the conclusion was reached that the use of conventional lightning arrester protection on distribution lines was not economically justified. Since that year few lightning arresters have been installed on transformer installations, excepting large transformer banks. However, during the past few years there have been two factors which have somewhat changed the picture as it was in 1931. First has been the increasing frequency and severity of electrical storms in southern Idaho. Second is the intensive rural electrification program that has added some 3,000 miles of rural distribution line to the Idaho Power system. This additional line has not only increased the exposure to lightning, but requires that trouble-men must travel greater average distances in replacing fuses and transformers damaged by lightning, thereby materially increasing the operating expenses of maintaining service in these outlying rural areas.

It has become more and more apparent from annual summaries of outage costs that lightning protection, if it could be provided for approximately $5 or less per transformer, would create substantial savings.

Spill gaps appeared to be a possible answer to the problem and for a time a considerable number of cover bushing distribution transformers fitted with spill gaps were purchased. While the spill gaps unquestionably protected the transformer from lightning damage, they were, at best, only a partial solution of the problem. As the gaps were behind the transformer fuse, every flash-over took out the fuse; and eventually it was necessary to remove all the gaps, as they proved to be extremely vulnerable to bird trouble.

NORTHWEST ASSOCIATION REPORT

Prepared for the Transmission and Distribution Committee (R. J. Davidson, chairman) for the 1942 meeting of the Engineering and Operating Section, Northwest Electric Light & Power Association.

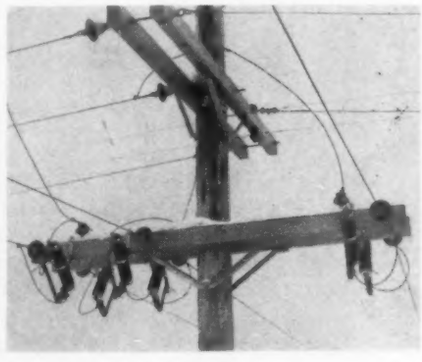
More recently it was proposed to install spill gaps at each transformer ahead of the fuse, together with the installation of coordinated fuses, based on short circuit current, at strategic points on the feeder. Certain changes in the substation relay equipment were also involved. Several areas in the territory served by Idaho Power have proved to be especially subject to lightning troubles, and it was felt that distribution feeders in these localities would be particularly suitable for trial installations.

The scheme itself is not complicated. As previously mentioned, a spill gap is installed at each distribution transformer ahead of the transformer fuse, as shown in Fig. 1. At various locations on the feeder, fuses are installed that are coordinated, not only with each other, but also with the substation feeder switch through the medium of protective relays. A typical installation of these fuses on a 3-phase junction is shown in Fig. 2.

**Fig. 1—Spill gap installed ahead of the transformer fuse at typical location**

Assume that a lightning and wind storm, which is our most troublesome type, occurs and a lightning surge causes a spill gap to flash over. The subsequent power-follow current trips the substation switch, which opens and immediately recloses. The momentary outage has interrupted the power-follow current and restored the feeder to normal. At another location on the feeder, and on the load side of a protecting line fuse, assume that the wind has caused a tree limb to fall across the primary conductors. In this case the fault current causes the substation switch to open, but it immediately recloses and again trips open. This time the switch remains open for a period of 50 sec. and again recloses. As the fault has persisted, the switch again trips open and remains open for another 50 sec. After the second delay, the feeder switch recloses for the third time and remains closed. Some time between 0.26 sec. and 4 sec. after the third re-

**Fig. 2—Typical installation of coordinated fuses on a 3-phase line junction**



closure the line-protecting fuse nearest the fault melts out and normal service is restored to the feeder, excepting the faulted section.

If the fault is not cleared due to improper operation of the fuses, or if the fault has occurred between the feeder switch and a protective fuse, the feeder switch will be tripped by very inverse induction relays sometime between 4 sec. and 15 sec. after the third reclosure, depending on the magnitude of the fault current.

This relay operating sequence is obtained by use of a company-built reclosing relay which is essentially an SG relay with a mechanically-operated latch to prevent closing of the contacts except when unlatched, and a rotating drum driven by a small synchronous motor to operate micro switches and the mechanical latch. The protective phase relays are very inverse Type CO low energy or IAC very inverse relays with instantaneous attachments. The ground relay is Type CO or IAC 4-sec. definite time limit. The reclosing relay recloses the feeder switch immediately following a trip-out, and closes the feeder switch twice more at 50-sec. intervals should the switch be open when the reclosing contacts are unlatched. Just before the last reclosure a contact is made to operate a transfer relay which opens the trip circuit from the instantaneous attachments and permits a time delay trip if the fault is not cleared by the fuses on the line.

A prior set-up involved only one instantaneous trip and immediate reclosure before the switch held-in to melt out the sectionalizing fuse. However, certain difficulties were encountered, due to the 2-min. operating cycle of the reclosing relay. Because 2 min. must elapse after an operation before the relay is reset, it was found that flash-overs on the spill gaps occurring oftener than 2 min. apart would cause the switch to lock out.

At the present time company relay engineers are working on a relay switch with a total operating cycle of 1 min. instead of the 2-min. cycle now in use. This 1-min. cycle relay will have the same operating cycle except all time intervals will be approximately one-half those of the 2-min. relay. This scheme is the most recent and will probably be the final version.

The fuse sizes are selected after setting up an impedance diagram of the feeder in conjunction with the time-current curves of the fuses. The impedance diagram is carefully prepared by the use of symmetrical components and it might be mentioned that short-cut or approximate methods are not usually sufficiently accurate. Fig. 3 shows the appearance of a typical impedance diagram and attendant set of time-current fuse curves. Arbitrary limits on the time scale have been set at 4 sec. as maximum and 0.26 sec. as minimum. In order to facilitate use of the fuse curves, the current scale has been converted to ohms at the operating voltage of the feeder. Complete instructions on the preparation of feeder impedance diagrams by the use of symmetrical components may be found in recent papers on the subject.

Very precise and positive fuse operation has been obtained on metallic faults. However, due to variation of contact resistance of phase-to-earth faults, which results in higher total fault impedance, some failure of fuse

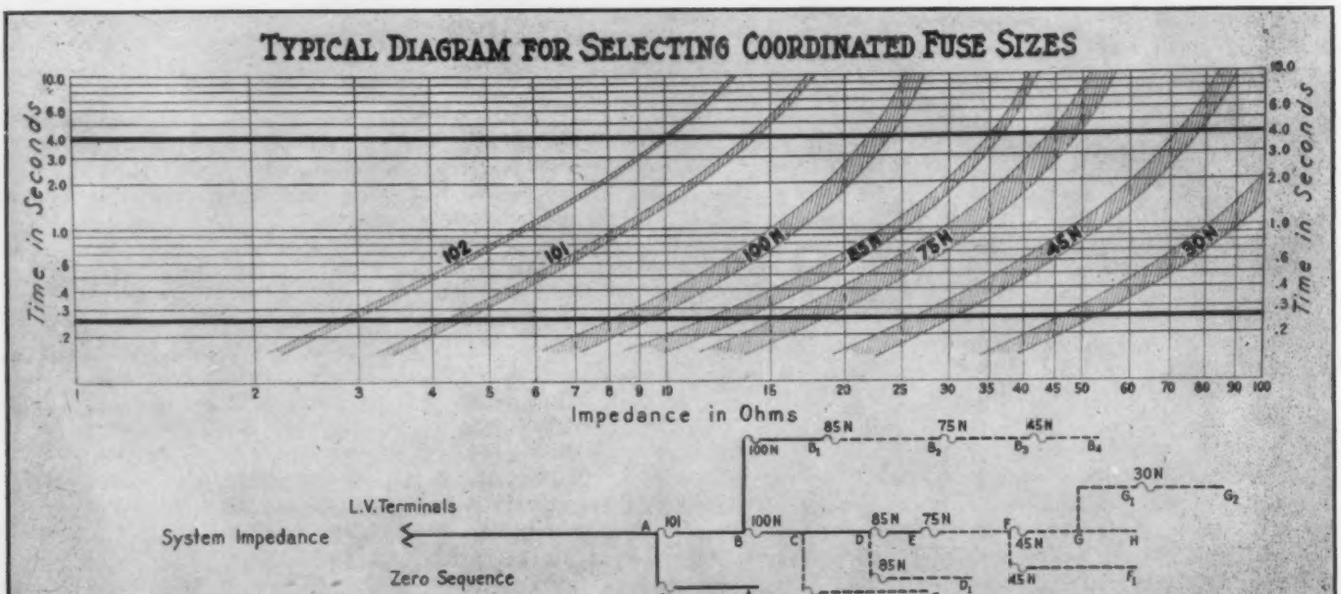



Fig. 3—Typical impedance diagram for a distribution feeder with the attendant set of time-current fuse curves. On the fuse curves, the current scale has been converted to ohms at the operating voltage to facilitate quick use of curve

clearance has been experienced. In this event the feeder switch is opened and locked-out before 15 sec. by the transfer relay as previously mentioned.

The momentary interruptions of service created another problem in connection with the rather extensive irrigation pumping load on Idaho Power Co. lines. Most of the pump motors are equipped with starting switches having a no-voltage release. As a result, practically all of the irrigation pump load on a feeder would drop off at the first momentary trip-off resulting from only a transient fault and would remain off until manually reset. As a majority of the pumping plants are unattended, this was a source of annoyance to the customer and also resulted in some loss of revenue to the company. This problem was met by the installation of mercury-type time delay opening relays across the seal-in contacts of the motor starting switch, which permits the pump to ride through brief interruptions of the order of 1½ sec.

On the early spill gap installations the total gap spacing was set at 2¼ in. for use on 12.5-kv. feeders. However, it was found necessary to reduce this setting due to the considerable number of old transformers whose insulation was inadequate for the 2¼-in. spacing. Since reducing the gap settings no more transformer or fuse failures due to lightning have been experienced. The gap spacing has been finally set at 1½ in. Another modification has been made in order to minimize the increase in gap length resulting from evaporation of electrode material during flashovers. This has been accomplished by setting the electrodes out of line and beveling the ends so as to make opposite faces parallel. This feature is clearly shown in Fig. 1.

On the substation end several problems have been encountered, principal of which has been the possibility of exceeding the maximum safe temperature of the substation transformers during the fuse-clearing time of 4 sec. In one or two cases it was found necessary to reduce the clearing period to a maximum of 3 sec. At the present time this problem is being approached on a different basis, which involves installation of thermal relays within the transformer, thus providing positive protection against overheating. In a number of cases it has been necessary to replace the high tension fuses with fuses of different make and rating in order to coordinate with the feeder oil switch and the distribution line fuses. It should perhaps be mentioned that actual field tests have been staged on most of the feeders operating on this basis by placing artificial faults on the line and obtaining calibrated oscillograph records. Analysis and study of the oscillograph charts has given a positive indication of any improper functioning of equipment and has shown what corrective measures should be undertaken.

Some very gratifying results have been obtained during the past year. In late July, 1941, the rural territory in the vicinity of Twin Falls was subjected to a lightning and wind storm of more than average severity. This territory is served from a 2,000-kva. rural substation by three 12.5-kv. radial feeders comprising in total 200 mi. of distribution line and approximately 800 transformers. At the time of the storm, the work of installing coordinated fuses on the feeders and equipping the transformers with spill gaps was about half completed. During the storm not a single transformer fuse or transformer was lost where spill gap protection had been installed, while some 75 transformer fuses were blown and three transformers damaged out of the transformers that had not been given this protection. More than 25 non-coordinated branch line fuses blew during the storm due to lightning, whereas none of the new coordinated fuses blew from transient faults. Similar excellent results have been obtained to date on other feeders that have been completely coordinated and spill gapped for some time.

Despite the fact that a number of problems have been encountered in connection with the application of this scheme of operation to distribution feeders, it is felt that, in general, the results obtained from these trial installations have been entirely satisfactory. Due to the improvement to be obtained in feeder operation and the resulting economies, the company feels justified in proceeding with a program under which the scheme will be applied to all 12.5-kv. feeders in the system as rapidly as equipment can be obtained.

# Questions and Answers

QUESTION: *What are the best and quickest methods for obtaining the power factor of fluorescent lamps and neon sign installations, as well as other single and three-phase loads?*

ANSWER: A text book could be written on the measurement of volts, amperes, power factor and kilowatts on single and three-phase loads. Probably the best and quickest method is by using a set of instruments that are already connected up so that they may be plugged directly into the circuit to be measured. Devices of this type are marketed as "load analyzers," which have voltmeter, ammeter, wattmeter and power factor meter self-contained in one box. Such a load analyzer is extremely accurate and quick to use but it is relatively expensive.

Another device uses a wattmeter element with special markings on the disc. Where other devices are not available, it is possible to use a watthour meter, an ammeter and a voltmeter. The latter two will measure volts and amperes, from which the volt-amperes may be calculated. Counting meter disc revolutions over a given period of time will indicate average kilowatts (tables are available for various sizes and types of meters.) The ratio of kilowatts to kilovolt-amperes will give the power factor.

**This department has been set up to answer technical queries submitted to the "experts" in the recent PCEA quizzes and to give the answers to questions sent to the editors from time to time. Reader's queries will be submitted to men best qualified to answer them, as were those turned in during the "Information Please" quiz**

QUESTION: *What is the best and quickest method for testing three-wire watthour meters in the shop, which does not require the opening of the potential link of the meters?*

ANSWER: Probably the quickest method would be a test using two rotating standards and two loads for the meter, these loads to be put between the outside lines and the neutral.

Although this method may be the quickest, it is not necessarily the best. It would not be the best if it were desirable to maintain the same method of testing in the shop as is done in the field because it would necessitate the meter tester carrying around two standards and two load boxes. Probably the best method would be one where the shop and field tests are performed in the same manner.

The practice of a number of utilities is to test the two current coils of the meter separately. This not only insures

that the current coils are balanced, but it also insures that the meter is accurately adjusted. There does not seem to be any difference between the two test methods outlined as far as accuracy is concerned.

QUESTION: *Why not adopt a policy of three-element protection for all three-phase motors? The present two-element protection is not adequate for single-phase operation when a primary fuse blows on a star-delta bank of transformers.*

ANSWER: This is solely a matter of economics. Less than 10% of the three-phase motors employed in industry are installed under the conditions outlined. The exception is in the agricultural pumping regions of the far West. However, due to increased cost and increased dimensions of three-element starters, their standardization would be vigorously opposed by users. This difficulty is not likely to occur where all the apparatus is in proper working condition.

QUESTION: *Has pole top resuscitation for linemen been adopted by any of the power companies on the Pacific Coast. If so, what has been accomplished?*

ANSWER: Pole top resuscitation is being taught to the line crews of several Pacific Coast utilities on the theory that the first few minutes following shock are the most important ones. It is not supplanting, but rather is supplementing the Schafer prone pressure method. The latter is recommended for application as soon as the victim is removed from the pole—or confined quarters, because the pole top method is applicable in such places as behind a switchboard, in a trench, etc. Some instances have been reported here on the Pacific Coast of successful application of the method.

For a full and authoritative discussion of the subject, see "Resuscitation After Electric Shock" by Chas. F. Dalziel, ELECTRICAL WEST, April, 1941, p. 38.

# Cables Balanced

## Discarded transformer cores used to balance reactance on Grand Coulee emergency generator leads

By F. R. SCHLEIF
Assistant Engineer, USBR, Coulee Dam

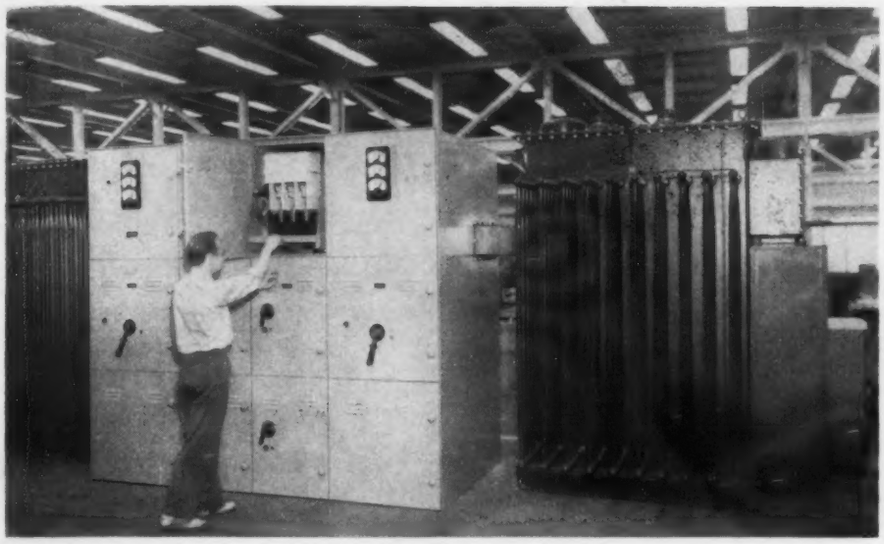
DURING an early stage of development at the Grand Coulee Power Plant it suddenly became necessary to increase the capacity of one of the outgoing feeders from the station service bus to carry the full 20,000 kw. capacity of the station service units to the Bonneville distribution lines. This emergency arose from the loss of a large generating unit from the connected system.

The Bureau of Reclamation had arranged to supply a large amount of power from the newly installed station service units to the Bonneville Power Administration system which was heavily loaded by the rapidly developing aluminum plants. Since the first main 108,000-kva. generating unit was to be ready to go onto the line in less than a year, the connection from the station service units to the main transformer bank was made through the largest permanent cables connected to the 6,900-volt station service bus. These cables were 1,750,000-circ mil., single-conductor, and had a maximum of approximately 14,000 kva. Upon the loss of a large generating unit which had been feeding power into the Bonneville system, it suddenly became necessary to increase the capacity of this circuit to deliver the full capacity of the station service units.

There was no single conductor cable of sufficient capacity available, so a parallel set of feeders was made up from No. 4/0, three-conductor cables. One run of three-conductor cable was used for each phase, with the three conductors in parallel. Each phase of the circuit from the station service bus to the main transformer bank then consisted of one 1,750,000-circ. mil. cable in parallel with the additional cable of three parallel No. 4/0 conductors. This provided sufficient copper to carry the necessary current but the reactance of the three-conductor cable connected in this manner was so much less than the reactance of the heavy single-conductor concentric-lay cable that the smaller conductors would have carried far more than their proportion of current, and would have been destroyed by overheating had not measures been taken to balance the reactances of the two paths in inverse proportion to the copper cross-section.

Obviously, additional reactance was required in the three-conductor circuit to limit the current. This reactance was supplied by stacking the cores from small discarded transformers around the cables as shown by the accompanying photograph. It was possible to calculate the approximate amount of iron required for each circuit, and final balancing was easily acomplished by adding or removing laminations to secure the correct current division as indicated by the switchboard ammeters. The laminations were stacked upon transite sheets, with spacers at the bottom so as to provide air circulation for cooling. Different amounts of reactance were required for the different phases because the cables installed for this temporary use were cut to various lengths which would be required for final installation elsewhere. This avoided waste of cable and unnecessary future splicing. No binding of the laminations was necessary, as they were tightly held in place by the magnetic pull. The lead sheaths of the cables were heavily taped, however, to prevent any possible abrasion of the sheaths by vibration of the laminations.

**Cores from discarded transformers were stacked around these emergency cables to balance reactance when they were paralleled with larger permanent cables to transmit the full output of the Grand Coulee station units to Bonneville lines**



This is a typical 1,200-kva. Pyranol load-center unit substation installed on the manufacturing floor of a wartime ordnance plant showing draw-out circuit breakers.

# Advantages of Load-Center Distribution

**Savings of critical materials would result if system were to be applied to new industrial plants; other advantages include flexibility, simplicity, safety and speed of installation**

INDUSTRIAL expansion coupled with the need for conservation of critical materials give added significance to the possibilities of applying the load-center form of power distribution to industrial plants, shipyards and naval and military projects. General Electric engineers who have studied the situation estimate that application of this system universally to proposed expansion in 1942 would save upwards of 5,000,000 lb. of copper and steel, mostly in power cable. Plants also could commence production earlier because speed of installation is an inherent advantage of this equipment.

As applied to industrial plants the load-center scheme is an adaptation of a technique widely used in utility distribution. Instead of a large 2,300 or 15,000-volt substation with attendant long, heavy low-voltage cables distributing power throughout the factory, energy is distributed directly to the production area at high voltage and then stepped down to utilization voltage in small unit load-center substations. Short secondary cables then feed to motors, lamps and other utilization equipment.

Estimated savings for a medium-sized factory with a power demand of 3,000 kva. and utilization voltage of 480 supplied from two 13,200-volt feeders, would be 7,800 lb. of steel, 11,500 lb. of copper and 1,300 lb. of other materials. This means a savings of $12,000 or more than 21% over the more complicated outmoded systems of distribution. Savings accrue from several factors. Because the secondary feeder runs are short, less cable is needed. Since the smaller transformers of the load-center unit substation need less secondary short circuit current, smaller feeder breakers can be used. Instead of an outdoor switching station, a small, compact metal-clad structure is employed. The unit substations are factory assembled and wired; hence time is saved in installation. No vault or base is required. Another advantage is the simplicity with which the equipment can be ordered; only functional specifications are necessary.

Improved performance and efficiency are further advantages. Because of shorter secondary runs, voltage variations and flicker are less than with the old systems. Better performance of motors and lamps is assured and consequently more and better production results. In the event of a failure service can be restored more quickly. Expansion of the system is relatively simple. Load-center units can be placed on the production floor where needed and units added when and where required without disturbing the distribution system. They can be moved easily from one location to another to cope with changes in electrical demands that might accompany changes in manufacturing technique.

Flexibility is a major advantage occasioned by any one or any combination of four basic circuit arrangements. These are dictated by such individual requirements as safety to personnel and equipment, operating simplicity, maintenance, first cost, voltage regulation, power losses and flexibility.

A simple radial system is satisfactory for plants where occasional service interruptions would not be serious. Ease of operation and low first cost are advantages. Reliability is not as high as with other systems and inspection and maintenance might require interruption in power flow. The primary selective system provides for two sources of power supply, thus making available an alternate source in case one primary feeder fails. Emergency operation is complicated by the need for primary circuit switching, whereas normal service switching operations are accomplished with low voltage breakers.

Of the four basic circuit arrangements, the secondary selective system assures high service reliability. In this scheme the load center has complementary branches, each permanently associated with a particular high voltage feeder. Transfer from normal to emergency operation is accomplished by means of a low-tension tie breaker between the two complementary sections. In normal operation the system operates in simple radial manner with the tie breaker open and transfer breaker closed. The final system is a secondary network arrangement. It is more complicated and more costly than the others but has very high service reliability.

The unit substation used in load-center distribution is a compact unit assembly of a high-voltage switchgear section, a step-down transformer section and a low-voltage switchgear section, ready for indoor installation. With a weatherproof housing, it can be installed outdoors. The transformer sections are three-phase units, either non-inflammable-insulating-liquid type or air-cooled. The switchgear sections have removable breakers with mechanical interlocks. There is a full complement of meters, instruments and relays.

In computing the savings of materials through use of the load-center system, calculations were based on using varnished-cambric interlocked cable in both instances.

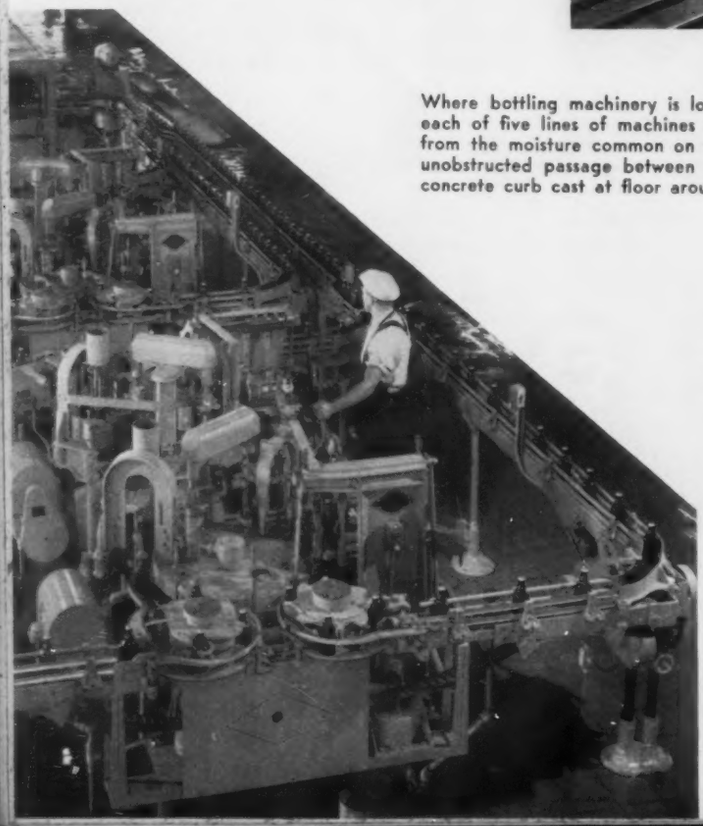
# Electrical Acme

## New modernistic brewery addition initiates cellular floor to the West

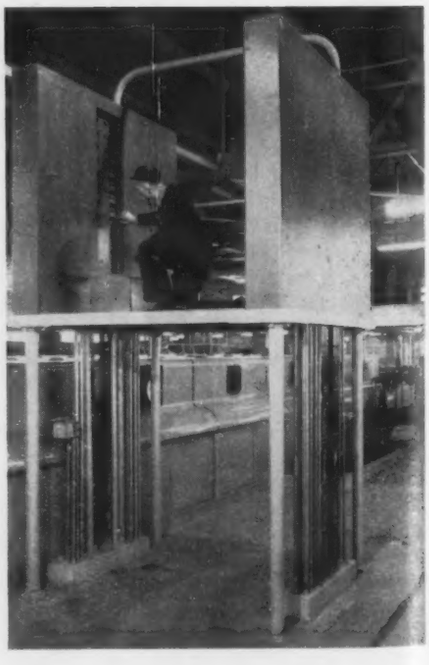
**Streamlined in appearance, Acme Brewery's new bottling and storage wing in San Francisco is an exceptionally electrified plant. Engineered and installed by Buzzell Electric Works, San Francisco, with Eugene Chaix, construction superintendent, it embodies intricate interlocked conveyor control, fluorescent lighting throughout, elaborate intercommunication**

But new to the West is its employment of the Robertson cellular steel floor for electrical distribution. Chosen for its structural qualities primarily, this cellular floor provided just the wanted flexibility and accessability for the intricate electrical system. Dropped ceilings prevented its use for the fluorescent lighting, which was therefore run in conduit, but the floor cells were used for all power and control wiring for the 310 motors used on the extensive bottling and conveyor equipment

To eliminate long feeder runs and give better voltage the main transformer bank for the building (above) was located on the third floor. At the main panel, three 250-kva. Pyranol filled transformers step down the 4,160-volt primary to 440 v. Lighting is taken off the 440 on each floor by a bank of 10-kva air cooled transformers (seen at upper left). Each floor has 3 power panels, circuit breaker type, from which 2 cellular headers run to feed the access units (at right) which in turn feed the floor cells. Access units are spaced at 2½ ft. intervals



Where bottling machinery is located, on fifth floor, panels for each of five lines of machines are mounted on platforms 7 ft. from the moisture common on the floor (at right), also giving unobstructed passage between conveyor and bottling lines. A concrete curb cast at floor around risers protects from moisture



Circuit breakers, starters and control equipment for bottling machinery were located in these elevated panels. Waterproof start and stop buttons and pilot lights were located at all operating positions, such as on the bottling line at left. Note that all feeds to motors and control stations come directly up from the floor as needed. There is no overhead conduit. Inserts to cellular floor ducts and stubs to motors or control stations were heavily waterproofed. Any future changes in position of machinery can likewise be accommodated because of the existence of channels in the floor everywhere

# Simplification in Wiring Field

**War brings peculiar twists to situation as scarcities of certain materials are felt**

WAR has brought a drastic simplification to the field of wiring supplies. While simplification has been the aim of the contracting branch of the industry for years, some peculiar twists have been given to the situation under the war emergency. On one hand, the 1937 tables of the National Electrical Code have been returned to use and one grade of wire, type R insulation only, permitted. On the other hand covered neutral and bare neutral or CNX wire has again been proposed by the utility group.

Meanwhile, Underwriters Laboratories has been working on emergency alternate specifications to help relieve scarcities of certain materials. Manufacturers of porcelain wiring boxes, knobs and tubes have proposed porcelain wiring systems to save metal.

Out of the combination of forces playing upon the subject has come a recommendation by Alvah Small, chairman, Electrical Committee, NFPA, for a tentative interim amendment to the 1940 edition of the Code. This amendment reads:

"Note: For the duration of the defense emergency and to assist in the conservation of copper and rubber, conductors having Code grade rubber insulation that are not operated continuously with maximum current may have the allowable current carrying rating given them in table I of the 1937 edition of this Code and the limits of allowable current because of more than three conductors in a raceway (note 5, page 303, 1940 text) and because of room temperature being over 30 deg. C. (table I page 301, 1940 text) need not be applied."

The proposal for CNX has come through Lessing J. Rosenwald, chief, Bureau of Industrial Conservation. Chairman Small of the Electrical Committee has answered that emergency use of such wiring for defense housing construction can be handled under the "trial installation" status provided in the Code, and meanwhile if local inspection authorities keep in touch with the projects wired by this method, added data as to the service record of the material will be available for consideration.

The Bureau of Industrial Conservation of OPM has authority to use whatever type of building material it specifies in defense housing or other defense construction during the emergency, it was pointed out by the National Electrical Contractors' Assn. and that the Code need not be opened up to cover this emergency order. The latter also points out that CNX has only been made in sizes No. 14, No. 12 and No. 10 AWG wire and that the tooling and training of personnel to turn out this wiring would constitute a waste of man power and machinery. Other limitations are pointed out to its use.

Underwriters Laboratories has listed a number of alternate materials permissible during the emergency, covering mostly substitution of steel for copper and copper alloy, enamel coating for electric metallic tubing, reduced lengths of heater cords and other cords supplied with made-up waterproof lamp holders, etc.

The porcelain wiring system advocates play for a return to knob and tube wiring as involving less critical or scarce materials.

## Lighting Men Win

A large number of prizes in the General Electric Co. Lamp Department's lighting proof data contest were awarded to Southern California lighting men. Entries consisted of a set of facts proving that an improvement in the lighting of a store, office, restaurant, service station, schoolroom or other commercial or industrial establishment had had a profitable result in better selling, better working conditions, greater safety or any other advantage to the owner or the public. Cash prizes of from $2 to $100 were awarded.

More entries and more winners came from Southern California than from any other part of the country, according to E. P. Markee, manager of the lamp department's South Pacific division, who announced the successful contestants as follows:

$25 award: D. K. Grandey, Southern California Edison Co., Vernon.

$5 awards: W. H. Aird, Union Hardware and Metal Co., Los Angeles, two; Warren B. Smith, Edison Co., Pomona, two; Harold M. Slott, Listenwalter & Gough, Los Angeles, two; David Goldstein, Fluorescent Engineering Co., San Diego; Frank Van Gilluwe, Holophane Co., Los Angeles; Willard G. Bausman, Edison Co., Alhambra; George J. Thom, Hollywood Wholesale Electric Co., Los Angeles.

$2 awards: Frank Van Gilluwe, Holophane Co., Los Angeles, seven; D. K. Grandey, Edison Co., Vernon, three; David Goldstein, Fluorescent Engineering Co., San Diego, two; George J. Thom, Hollywood Wholesale Electric Co., two; Harold M. Slott, Listenwalter & Gough, Los Angeles, three; Walter H. Aird, Union Hardware and Metal Co., Los Angeles, eight; Warren B. Smith, Edison Co., Pomona, two; J. C. Glover, Electric Corp. of California, Los Angeles.

● WIRING POLICY CHANGES announced by Southern California Edison Co. in the interests of conserving critical materials, have been announced by H. C. Rice, manager of domestic sales. Beginning Jan. 19 the new policy provided: Range wiring for new construction, a certificate worth $12.50, for range, $10 water heater, if installed within two years of certificate date; previously unoccupied new homes not wired for range, a service entrance unit or allowance of $12.50, $10 for water heater, provided these are installed at the time they occupy the new house; present range and water heater users who move, a service entrance unit for range, or $10 allowance for wiring in water heater provided they continue to use these electrical appliances. The latter are limited to one move per customer and only after 12 months use at the first location. These allowances apply only to single family dwellings.

● HYGRADE SYLVANIA CORP. reports that the rated life of the 100-watt fluorescent lamp has been increased from 2500 to 3000 hours, effective Feb. 2. When this lamp was introduced a little more than a year ago, it was given a rated life of 2000 hours and was listed at $3.75. Today the list price is $2.60. A price reduction on Hygrade fluorescent lamps of approximately 15% was announced about a month ago. The company states that prices on the line have been cut approximately 60% and rated life of the lamps has been increased 66% since they were put on the market.

● ELECTRICAL CONTRACTORS at New Westminster, B. C., have been notified that no wiring material is available for houses, and as a result it is anticipated by civic officials that civilian house building soon will cease temporarily. A shortage of rubber for insulation is the cause of the ban.

● MORE THAN 20 former members of the San Francisco Electrical Contractors' Assn. have closed places of business and have been placed in the Union for defense work, according to W. J. Varley, business representative for the contractors' association.

# LIGHT for OFFICES

## I. Incandescent

### Who

Office of P. F. Collier & Sons, Portland, S.W. 10th Ave. and Washington St., Portland. Engineered by W. E. Carson, Northwestern Electric Co. Installation by Jagger Sroufe Co., electrical contractor.

### The Need

Unobtrusive yet high intensity illumination at desks.

### Conditions

Office with 21-ft. ceiling, painted oyster white with pastel green side walls.

### Installed

Five 1,000-watt No. 203 Silvray indirect fixtures on 13 by 18 ft. centers.

### Results

Footcandle intensity at desk level, 26 fc.

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## II. Fluorescent Troffers

### Who

Chism Ice Cream Co., new office and factory, Reno, Nevada. Engineered by Fred Steiner, Jr., Sierra Pacific Power Co.; installed by Moltzen & Fitch, electrical contractors.

### Conditions

Business office, 23x49; ceiling, 12 ft. 6 in. Executive offices and halls similar. Walls and ceiling light colors.

### Installed

Approximately 250 ft. of recessed Miller Troffers. In the business and executive offices, on 5-ft. spacing; three rows in private offices; in business office 2,100 watts, 1.53 watts per sq. ft., of white F lamps, 36 48-in. and 12 24-in. Halls have three 48-in. Troffers on 8-ft. centers. After 100 hours burning, 33 to 43 ft.

**EMEA** *Dope Sheet* — *Edited by Howard C. Park*
EMEA of So. Calif.

# Electric Motor Performance—1

## Operating standard 220V. induction motors on 120/208V. network systems

Standard 220 v. induction motors may be operated successfully on 208 v. systems providing the voltage limits of 198 and 242 v. are not exceeded. Since 120/208 v. network systems are supposed to be held to a plus or minus 3 or 4%, or 199 to 217 v., the voltage limits for successful operation should not be exceeded.

The consideration of frequency variation may be eliminated; since public utilities maintain practically constant frequency for the purpose of tying together of generation stations.

It should be especially noted that a 10% variation of voltage is not permitted below 208 v. for 220 v. rated motors.

Should the motor name plate be stamped 208 v. the manufacturer assumes the responsibility for its operation in accordance to the American Standard within voltage variations of 187 to 229 v.

### Effect on 220V. Motor Characteristics Torque and Output

As the starting and maximum running torques of induction motors vary approximately as the square of the applied voltage, a 220 v. motor will have these quantities reduced 11% when operating on 208 volts. The same variation holds true of the maximum momentary-overload capacity in horsepower.

On ordinary motor applications where torque and maximum output are not limiting features the reduction of these values is not significant.

On applications where torque requirements are critical a motor with the necessary torque characteristics must be provided.

On applications where maximum out put is required it may be necessary to provide a higher horsepower rated motor.

These conditions may also be met by providing a stator winding designed for 208 v. In some instances it may be found best to boost the voltage at the motor terminals with an autotransformer.

### Speed

The speed of an induction motor varies inversely approximately as the square of the voltage. The slip of a 220 v. motor would be increased to about 1.12 times its normal value if operated on 208 v. since the slip is normally but a few per cent of synchronous speed, the full-load speed is not materially changed.

As an example: Assume a 6-pole, 60-cycle motor with full-load speed of 1140 rpm. at 220 v. The slip is 1200-1140 or 60 rpm. At 208 v. the slip becomes 1.12x60 or 67 rpm., and the full-load speed 1133 rpm.

The design of the general-purpose induction motor is a compromise of various factors, resulting in the best obtainable efficiency and power factor with suitable overload and starting characteristics.

*(More on Efficiency Next Month)*

### General Effect of Voltage and Frequency Variations of Induction Motor Characteristics

| | Voltage Variation | | | | Frequency Variation | | |
|---|---|---|---|---|---|---|---|
| **Motor Function** | **120% Voltage** | **110% Voltage** | **Voltage Function** | **90% Voltage** | **105% Freq.** | **Freq. Function** | **95% Freq.** |
| **Start & Max. Run Torque** | 44% inc. | 21% inc. | $(\text{volts})^2$ | 19% dec. | 10% dec. | $\frac{1}{(\text{freq.})^2}$ | 11% inc. |
| **Synchronous Speed** | no change | no change | constant | no change | 5% inc. | frequency | 5% dec. |
| **% Slip** | 30% dec. | 17% dec. | $\frac{1}{(\text{voltage})^2}$ | 23% inc. | slight change | | slight change |
| **Full Load Speed** | 1½% inc. | 1% inc. | | 1½% dec. | 5% inc. | Syn. speed slip | 5% dec. |
| **Efficiency Full Load** | small increase | ½–1 pt. dec. | | 2 pts. dec. | slight inc. | | slight dec. |
| **Efficiency ¾ Load** | ½–2 pts. dec. | slight change | | little change | | | slight dec. |
| **Efficiency ½ Load** | 7–20 pts. dec. | 1–2 pts. dec. | | 1–2 pts. inc. | slight inc. | | slight dec. |
| **Power Factor Full Load** | 5–15 pts. dec. | 3 pts. dec. | | 1 pt. inc. | slight inc. | | slight dec. |
| **Power Factor ¾ Load** | 10–30 pts. dec. | 4 pts. dec. | | 2–3 pts. inc. | slight inc. | | slight dec. |
| **Power Factor ½ Load** | 15–40 pts. dec. | 5–6 pts. dec. | | 4–5 pts. inc. | slight inc. | | slight dec. |
| **Full Load Current** | 11% decrease | 7% decrease | | 11% increase | slight dec. | | slight inc. |
| **Starting Current** | 25% increase | 12% increase | voltage | 10–12% decrease | 5–6% dec. | $\frac{1}{\text{freq.}}$ | 5–6% inc. |
| **Temp. Rise** | 5–6°C. decrease | 3–4°C. decrease | | 6–7°C. increase | slight dec. | | slight inc. |
| **Max. O. L. Capacity** | 44% increase | 21% increase | $(\text{voltage})^2$ | 19% decrease | slight dec. | | slight inc. |
| **Magnetic Noise (any load)** | noticeable increase | slight increase | | slight decrease | slight dec. | | slight inc. |

*NOTE—This table shows general effect, which will vary somewhat for specific ratings.

# Bulb Snatching Is OK Now*

**By N. H. Boynton**
Western Sales Manager
Lamp Department, General Electric Co.

"DON'T hoard lamps" can be told and retold despite present limitation orders. Research plus utilization of substitutes assures the production of all lamps needed for *essential* services.

Like many other commodities, lamps have felt the impact of various changes in the defense and war materials schedule. As far back as last September the industry learned what rumor can do. When the 5% excise tax was imposed, a buying rush was started by an inadvertent remark or two. The result was that September lamp sales were the largest in the history of the business. The hoarding that occurred then almost bought out the entire lamp stocks of the nation.

Fortunately nothing like that happened when the limitation orders were issued Jan. 26. These orders allocated 80% of the copper and 75% of the nickel used in 1940 to the lamp manufacturers for 1942 production. This might appear to be a serious curtailment, especially since 1941 sales were ahead of 1940. However, research had anticipated such shortages of critical materials. Substitutes had been developed and were being applied before the orders came out. Bases of new lamps were made of steel instead of brass, with only a small brass plate for contact. The amount of copper used in the new base is much reduced. Nickel lead-in wires in the lamp itself have been replaced with nickel clad wires.

With the present material supplies that are allowable for lamp manufacture, coupled with the use of substitutes, it should be possible to produce all of the lamps that will be required for *essential* lighting purposes except those types of lamps which are definitely limited or rationed by government order. As a matter of fact, the substitutes which have been developed and which are being studied in the laboratories will probably produce better lamps than were ever available before with some promise that in time they even may be cheaper.

Two classes of lamps will feel the effect of the materials limitations. Whereas 165 million Christmas tree lamps were produced last year, the 1942 production will not exceed 50 million. Supplies of these lamps must come from carry-over stocks and from the Christmas tree strings put away by the public in closets and attics. Up to May 1, manufacturers may produce 25% of the series type and 40% of the multiple type lamps made during the same period last year. Then production stops.

Christmas tree lamp production facilities will not be idle. This capacity will be devoted to making flashlight lamps. If the experience in England is typical, this capacity will be taxed to meet demands. There, the annual consumption of flashlight lamps has jumped about ten times. English factories were speeded up to satisfy about half of it, and the rest were imported.

Sign lamps and lamps used solely for decorative purposes no longer may be produced. Also it is possible that photoflash lamps may be curtailed except for use by the armed forces.

One great advantage that may accrue to the whole industry will be simplification of the 5,600 styles and types of lamps that manufacturers must now make to meet individual uses. Already the matter of simplification is being considered by the Conservation Section of the WPB. It is possible that the number of styles and types may be cut by at least one-third. To accomplish this, reductions would be made in the number of voltages, bulb sizes, wattages, and colors now available

The lamp sales promotion program must be modified to meet the new conditions. For the time being there will be no more "stock up" advertisements. The number one sales emphasis will be on "Light for Production." And this is where it belongs.

The green light has been flashed for the fluorescent lamp business. The benefits of this lamp to the whole industrial production program have been recognized, and manufacture will be maintained at 1941 peak levels. The sole limitation here may be in fixtures because plastics and many of the metals required are under limitation orders. As the result of research, there has just been announced a new three-unit fluorescent circuit with two 75-watt incandescent lamps for ballast. A new fixture of laminated wood with a minimum of metals has been designed to accommodate this circuit. Other circuits are being studied in the laboratory.

Mazda lamp manufacturers will not bring out any so-called blackout lamps unless these are approved and standardized by the army and civilian defense authorities. The army has under consideration at the present time a 15-watt lamp, orange-red on the inside, and black enamel on the outside, with a light emission aperture the size of a ten-cent piece in the base. Unless something like this is *approved* and *advocated* in official quarters, we will make no blackout gadgets.

## Hint to Contractors

Problems caused by the national emergency to small electrical contractors in agricultural territory, customers of Sierra Wholesale Electric Co. of Fresno, Calif., caused E. F. Hauch to offer contractors of the valley his "buried treasure" plan of self-help. Offered to contractors as "an idea that may help you pay those taxes," Hauch proposed:

"Most of you have electrical construction merchandise in your stocks that you neither need nor want in order to carry on such business as you can do. That merchandise can well be 'buried treasure' for you, because perhaps the fellow in the next town can use it. My plan is let him know that you have it, what condition it is in and what you want for it. We will not enter into any transaction that results. Just remember us when you have priority business to place and remember, too, that we are going to be here when this emergency ends."

A form questionnaire was sent to contractors throughout the valley asking them to list the quantity, description, condition, original cost, and price wanted for such surplus materials. Sierra Wholesale Electric then assembled all this and sent a master copy to all potential purchasers.

* Based on remarks at the Pacific Div. Meeting, NEWA, Del Monte, Calif., Feb. 7, 1942.

# Obey Priorities or Get Something Worse

N. J. McDONALD

CONSIDERATION of priorities, allocations and limitation orders as they affect supplies of electrical goods and materials, further study of distribution procedure to uncover weaknesses and formulate correctives and analysis of wartime relationships between wholesaler, manufacturer and utility topped the list of discussions at the winter meeting of the Pacific Division, NEWA, at Del Monte, February 4-7. In both interest and attendance (175), the meeting set new records.

Effects of priorities and limitation orders on the wholesaler were studied at two meetings, one open and the other restricted to members. N. J. McDonald, sales manager of Thomas & Betts, Elizabethport, N.J., special electrical industry advisor to OPM, was the key figure in these discussions, bringing the group the latest interpretations of new orders. McDonald declared that the priority system has shown no evidence of changing the wholesaler-manufacturer distribution relationship, and in his opinion this relationship will not be disturbed so long as the wholesaler cooperates in the priority procedure. He emphatically asserted that priorities, allocations and limitations are in for the duration and that normal commercial aspects are out. Any wholesaler who accepts unrated orders in the face of these conditions is bleeding his business to death and is drying up his sources of supply from the manufacturer, he said. He indicated how a manufacturer who does not receive priority extensions from the wholesaler is stalemated in securing materials. He explained the workings of the PD-1A and 3A orders and the M-67 allocation. This latter should stop hoarding and correct bad commercial practices.

McDonald predicted that electrical appliance manufacturing facilities including factory capacity now engaged in making lighting fixtures would follow the ruthless conversion trail of the automobile industry. While this might seriously affect the wholesaler, he predicted that the supply and equipment business resulting from the proposed $11 billion war construction program would more than offset such losses. Electrical manufacturing production in which the wholesaler has a stake will go up from $2½ to $5 billions for materials that go into plant or war equipment.

"The hatchet men and theorists are in temporary eclipse and will stay that way if business and industry will cooperate with Donald Nelson," he said. "Get behind the priorities extension program. If you don't you may get something far worse."

The outlook for the lamp business was reviewed in detail by N. H. Boynton, General Electric Lamp Department, Nela Park (see p. 46 this issue).

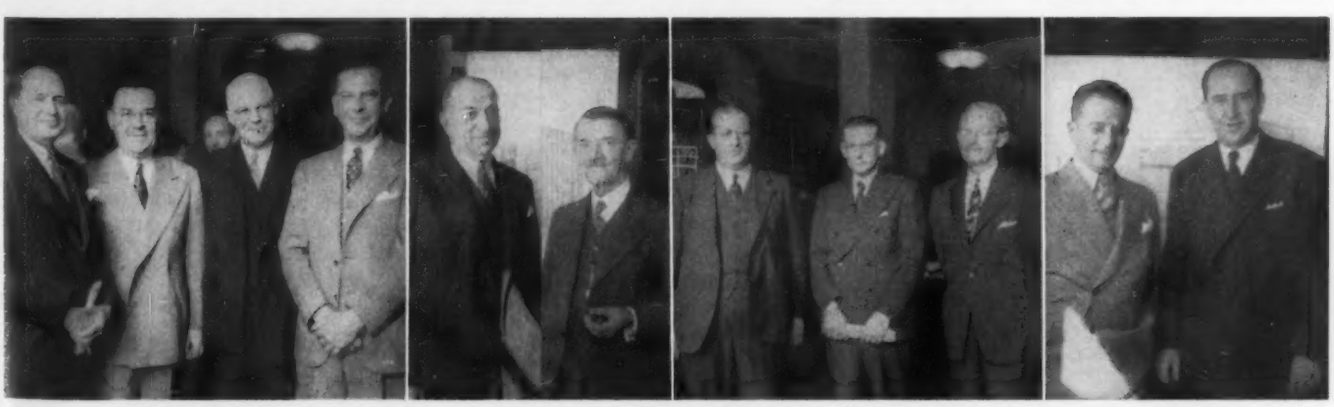
R. E. Fisher, Pacific Gas and Electric Co. vice-president, told the group that 300,000 kw. of new wartime industrial load had located or was to locate in central and northern California with attendant demands for electrical supplies. He also stated that 90% of the priority applications for power line extensions to agricultural power customers were receiving WPB approval because of the $1 billion demand for food placed on California agriculture. J. E. E. Royer, vice-president and general manager, Washington Water Power Co., reported that 700,000 kw. of new industrial plant facilities were being located in the Pacific Northwest to utilize Bonneville and Grand Coulee power. O. R. Doerr, Pacific Gas and Electric general sales manager, described how the programs initiated to mass-educate the public on blackout lighting, were building business. H. H. Courtright, president and manager, Valley Electrical Supply Co., Fresno, asserted that despite the war, the industry should not forget its merchandising technique or lose its merchandising manpower. George C. Tenney, editor, ELECTRICAL WEST, predicted a revolution in Pacific Coast economy when the full impact of the wartime basic industrial plant being located in that region begins to make itself felt.

In a plea for cooperation with the present War Production Board, Dr. Thurston H. Ross, professor of industrial management, University of Southern California, declared that "it is imperative for business and industry to be self-policing today so that they will not be besmirched by a few skunks who would like to take advantage of the profligacy of wartime government spending."

D. A. Smith, secretary and purchasing agent, Graham-Reynolds Electric Co., Los Angeles, was re-elected Pacific Division chairman, and R. A. Balzari was re-elected secretary.

In the golf tournament Leonard Marsh, owner, Marsh Electric Co., Long Beach, won the traditional Cop-

BOYNTON HIXSON KAHN PERGA DUGGAN COURTRIGHT
MARKEE WILSON NOACK O'NEILL MEYER



FISHER ROYER

per Cup; J. E. E. Royer, the Central Station Trophy; Lester Siebert, San Francisco manager, Trumbull Electric Co., the Manufacturers' Cup; and W. G. Tapping, Los Angeles manager, Cutler-Hammer Co., the Clendennin Trophy.

## IAEI Committees Chosen

Clifford Prud'homme, city electrical inspector, Sacramento, and president of the International Association of Electrical Inspectors, Southwestern Section, announced the appointment of committees for the section for the year. All the Code article committees were reappointed from last year. This was done, according to secretary H. L. Gerber, in order that the study conducted by these committees for changes in the National Electrical Code would be continued. Proposed changes for the Code will come up before the annual meeting in 1942.

General committee appointments were as follows: *Articles of association*, H. G. Ufer, chairman; *California State Safety Orders*, G. E. Kimball, chairman; *civil service*, O. K. Jones, chairman; *clearinghouse*, R. H. Manahan, chairman; *code coordinating*, F. A. Short, chairman; *investigation of fires and accidents*, H. V. Dobson, chairman; *legislative*, R. H. Manahan, chairman; *membership*, M. J. Siggins, chairman; *ordinance*, C. E. Heise, chairman; *Pacific Coast Building Conference joint committee*, Victor W. Hartley, chairman; *publicity and public relations*, W. A. Cyr, chairman.

● AIR CONDITIONING was the subject both of a talk and a visit to an outstanding installation for the Electrical Maintenance Engineers' Assn. of Northern California at its Feb. 26 meeting. Frank W. Jordan, district supervisor, air conditioning dealers, Westinghouse Electric & Mfg. Co., addressed the meeting at the El Jardin Cafe.

## Contractors Meet

Faced with the start of a series of demands, one city after another, for increases in the scale of wages for electricians, the Electrical Contractors Assn. of Northern California met for its annual meeting at San Francisco, Feb. 20. Called together by Dan Bronson, California Electric Co., Oakland, its president, the labor topic brought record attendance from cities and towns throughout the northern part of the state.

The union's contention that living costs have arisen was recognized but speakers pointed out that to start a new spiral of wage increases would bring them even higher and defeat the purpose of a raise. Others pointed out that because of labor scarcity overtime paid already was increasing pay checks more than enough to meet increased living costs.

Most emphatic complaint was that the demand for electricians had grown far faster than the ability to train such mechanics and that unions had supplemented their own regular memberships with large numbers of men on permits who could not in any sense be classed as journeymen electricians and it was unfair to pay them full scale and pay the trained skilled men no more. This discrepancy was causing the skilled men to want more per hour, several more members reported. The injustice of this situation was generally recognized, but the board of directors submitted a recommendation to the membership. In it it asked all local associations to demand a classification of men with appropriate wage scales in any negotiations for new agreements.

That one locality not be jockeyed against another a committee was voted to negotiate with international officers of the union for uniforming working rules, conditions, classifications, traveling time, and wages throughout the northern part of the state. This committee is to act as a clearing house for all local associations before they enter into separate negotiations.

Besides the wage topic the meeting heard reports from W. J. Varley, business representative of the San Francisco association who also had represented the Northern California group in Washington, D. C., to release to subcontractors electrical work on government projects which formerly had been cornered by general contractors who set up departments to handle electrical work.

Clyde L. Chamblin, past president of National Electrical Contractors Assn., described a new basis of assessments proposed by NECA to finance its Washington office and labor relations work. These dues would be 1/10 of 1% of electrical construction, in addition to basic dues. Roy Butcher, San Jose contractor who has been chairman of the California Contractors License Board and has been reappointed, spoke briefly on the purposes of the board. W. A. Cyr, secretary, discussed materials and priorities.

Surplus funds of the association were voted to be invested in U. S. Defense bonds.

At the close of the meeting election of officers placed T. L. Rosenberg, Oakland contractor in the chair as president, Robert Griffith, Crown Electric Co., San Francisco, vice president, W. A. Cyr, ELECTRICAL WEST, secretary, and on the board of directors Ed Pierce, Alca Electric Co., Vallejo; B. J. Solomon, Pacific Grove; Seth Cohn, Atlas Electric Co., San Mateo; J. D. O'Connor, Lupen & Hawley, Sacramento; Harry Eklund, San Rafael; Roy Butcher, San Jose; Tom Robinson, Fresno; Grover Grider, Stockton; and George Abbett, San Francisco.

## Discuss Substitutions

Growing concern over the handling of requests for substitution of materials was expressed by a number of electrical inspectors attending the Southern Chapter meeting, IAEI at Compton, Calif., Jan. 28. Paul H. Herkelrath, electrical inspector, San Bernardino, chairman, presided. Discussion of inspectors' problems covered the matter of substitutions as well as procedure for lighting of spray booths and danger of igniting volatile vapors.

At the afternoon session, Frank A. Hansen, director of Western Institute of Light & Vision, reviewed the entire problem involved in blackouts. As to reducing light in traffic signals, he cautioned against it as dangerous because of wide streets and fast-moving cars. Instead he advocated regular lighting be used but shaded with cylinders at least 18 in. long to break up the pattern of light sufficiently so that reflection on the street will not be visible from the air.

President George Kimball told of his trip last fall as president of the IAEI. He also announced the resignation of Gerald Price, former electrical inspector for Orange County, as a member of the Southwestern Section executive council, because he has become engaged in other work.

Next meeting of the chapter will be in Santa Monica, March 25, at which time an outline of methods followed by an inspector to check a wiring installation from the time the contractor brings in his plan and asks for a permit until the roughing in and finishing is inspected, will be presented by Arthur Veit, Harry Dobson and Arthur Kempston.

## Inspectors Visit Lab

What Underwriters' Laboratories does and where and how it does it provided an educational program out of the ordinary for the Northern California Chapter, International Association of Electrical Inspectors, Feb. 4. The meeting was held at the 500 Sansome St. Pacific Coast laboratory of Underwriters, where Howard Dodge, senior electrical engineer, was host.

First the new field laboratory housed in a trailer was inspected and a demonstration conducted from it in the driveway of the building. Ray Larrabee, field inspector, gave a resume of the field tests he conducts from this traveling laboratory, buying in the open market samples of wire, fuses, switches and other equipment and testing them under operating conditions. The trailer is also used to hold public demonstrations to inspectors, contractors, the public, schools, conventions, and dealer gatherings. It is housed in a trailer containing sound equipment, air conditioning, fluorescent lighting and standard laboratory equipment.

Called to order by Harold Gerber, secretary-treasurer of the Chapter, the meeting was turned over to Dodge, who introduced J. W. Cannon, H. E. Baker, G. W. Noller, F. J. Ryno and L. R. Givens of Underwriters staff. The group was broken into several units, each of which was shown the making of tests.

During the evening typical routine teste were made on (1) rain-tight elecal cabinets and switches, (2) burglar alarm systems, (3) enclosed switches, (4) radio and oscillograph, and (5) oil burner control. A short description of the tests was given and opportunity provided to ask questions.

In recounting the history of the San Francisco laboratory, Dodge told of its beginning when Ray Larrabee, its first field engineer, was sent to San Francisco in 1921. Later a laboratory was opened on Commercial St. and more recently the new laboratory at 500 Sansome St.

## League Heads Named

Members of the Electrical League of Utah at their recent annual meeting elected the following officers for 1942: E. J. Duggan, president; Ora H. Harlow and Reed Smith, vice-presidents; O. R. Bigelow, secretary-treasurer. Elias J. Strong was reappointed manager.

Duggan, who succeeds G. Wayne Stillman, is manager of the Westinghouse Electric Supply Co. Barlow is sales supervisor of the Salt Lake Division, Mountain States Telephone and Telegraph Co., and Smith, who represents the Ogden branch of the League, is manager of Wright Electric Co. in that city. Bigelow is manager of the Intermountain Utilities Appliance Co.

The following Board of Trustees was chosen: Representing wholesalers—

E. J. DUGGAN

W. J. Berryman, Mine & Smelter Supply Co.; Duggan; Leland B. Flint, Flint Distributing Co., and Roy Kimberlin, Graybar Electric Co. Representing contractors—Jack Jacobs, Apex Electric Co.; M. J. Kynaston, Sugar House Electric Co.; J. Vernon Sharp, Sharp Electric Co., and Kimball Vance, Vance Electric Co. Representing manufacturers—R. A. Conely, L. Brandenburger Co.; W. F. Fauber, Westinghouse Lamp Co; L. B. Johnson, General Electric Co., and L. R. Morris, National Carbon Co. Representing dealers—A. M. Baker, M & M Appliance Co.; Bigelow; J. Ernest Gillespie, Sears-Roebuck & Co., and G. Wayne Stillman, Radio Studios.

Barlow and Orson John Hyde of the Mountain States Telephone and Telegraph Co., and W. A. Huckins and C. A. Wolfrom of the Utah Power & Light Co. will represent the utilities.

**When Underwriters Laboratory, San Francisco, played host to inspectors the latter saw demonstrations of tests to externally operated switches, radio receivers, cords and fuses from the trailer lab and rain tests (in order shown below). Howard Dodge, electrical engineer in charge, may be seen at lower right at the rain test set-up**

● ART SCHANUEL, field representative for the National Adequate Wiring Bureau, is making a limited tour reaching to the Pacific Coast. He will appear on the program of the Northwest Electric Light & Power Assn., Business Development Section, meeting jointly with the Canadian Electrical Assn., Mar. 4 to 6 at Vancouver, B. C. Schanuel will have stopped at Butte, Mont., Feb. 27 and in Seattle Mar. 1 prior to the Vancouver meeting. On his return trip he will be in Portland Mar. 7, Spokane Mar. 9, Boise, Mar. 10, Salt Lake City Mar. 12, and Denver Mar. 16. Conversion of industry wiring activities to planning service that will assist in the low cost homes for the war program will be the object of Schanuel's conferences with industry wiring groups.

# PCEA Panorama — Edited by Mary Shoop

### Electriquiz

V. A. Bloxham, Southern California Edison Co., Santa Monica, is the author of this interesting true or false quiz. Compare your answers with those on page 70.

1. Electricty can be referred to as a fuel when it is used for heat.
2. Electricity has revolutionized photography.
3. During times of war and other stress, western power systems using local fuel and water for power generation are situated more favorably than eastern systems depending upon coal haulage.
4. Not more than three-fourths of California farm homes have electric service.
5. Electrically driven deep-well turbine pumps are products of western needs and western engineering.
6. War industrial production has demonstrated forcibly the need for high levels of illumination (50 ft.-candles or more) in manufacturing plants.
7. A motor properly wired for 440-volt operation produces more power than the same motor wired for 220-volt operation.
8. Hydro-electric three-phase power generation was first accomplished in the west.

## Contest over April 15

April 15, deadline for payment of California state income tax, also is the deadline for the annual Richard E. Smith Memorial Award essay contest. All employees of PCEA member companies are urged to count their blessings and enter the contest by writing 150 words to complete the statement, *I Like My Job in the Electrical Industry Because . . . .*

Successful entrants will be rewarded royally with free trips to the annual PCEA convention in San Francisco—an incentive which is inspiring widespread scribbling from San Diego to Stockton.

Your entry will be judged on composition, logic, originality and value of ideas. When submitting it, you must preserve your anonymity by enclosing your name, company affiliation and address in a sealed envelope attached to your essay. No identification should appear on the entry.

Your 150 well chosen words should be in by April 15 to PCEA at 447 Sutter St., San Francisco, or 601 West Fifth St., Los Angeles.

## Convention Ahead

### Industry's problems will be probed at sessions

PRESENT day problems and those likely to be encountered in the future will be analyzed at the 25th annual convention of the Pacific Coast Electrical Assn. to be held Thursday and Friday, May 21 and 22, at the Fairmont Hotel, San Francisco. With *Today and Tomorrow* as the theme, the convention sessions will center about the best means of adapting industry operations to current events and those which may occur after the war.

I. W. Borda, Pacific Coast manager of the Okonite Co., San Francisco, is general chairman for the convention, which has been abbreviated this year from its customary three-day length to a two-day business conference.

Plans for Thursday, May 21, carry out the *Today* theme, and include an opening general session in the morning, a luncheon at which a prominent speaker will give an address, and parallel sessions of committees and discussion groups in the afternoon.

The theme, *Tomorrow*, characterizes events planned for Friday, May 22. Included are a continuation of the parallel sessions in the morning, a luncheon featuring an outstanding speaker and a closing general assembly in the afternoon.

A banquet on Thursday night will be the only social event of the convention. Committee chairmen follow:

Program manager, B. W. Reynolds, PG and E, San Francisco; advertising and publicity, Charles Johnson, Westinghouse Electric & Mfg. Co., San Francisco; banquet and entertainment, H. Q. Noack, Hubbard & Co., Emeryville; hotel, James S. Moulton, PG and E, San Francisco; ladies' entertainment, Lorrin A. Nott, Sangamo Electric Co., San Francisco; reception, Arthur D. Bragg, General Electric Co., San Francisco; registration, E. A. Crellin, PG and E, San Francisco; cocktail party, F. C. Angle, Allis-Chalmers Mfg. Co., San Francisco; program committee, E. A. Long, PG and E, San Francisco; transportation, G. A. Campbell, Southern California Edison Co., Los Angeles, and Fred A. Mulvaney, Maydwell & Hartzell, Inc., San Francisco.

### Who Am I?

I was born in Stockton on May 12, 1886. After attending school there, I enrolled in Stanford University, where I received my degree of B.S. in Electrical Engineering with the class of 1909. My first job was in East Pittsburgh, Pa., as a student engineer with the Westinghouse Co. In 1910 I went to the Panama Canal to supervise installation of Westinghouse excavating equipment at the site of the Miraflores Locks. Who am I?

In 1911 I joined the Pacific Gas and Electric Co. in Petaluma as assistant engineer in the construction department. I served as a mapper in the Redwood district and in San Jose as mapper, estimator and assistant electrical distribution superintendent. In 1920 I resigned to become electrical engineer with the Bureau of Standards, Department of Commerce, Washington, D. C., where I assisted in compiling data for and writing the third edition of the National Electrical Safety Code. In 1922 I returned to San Jose as district electrical superintendent for PG and E. I was appointed division superintendent in December, 1941, the position I now hold. Who am I?

I am chairman of the operating economics section of PCEA, and at various times in the past have been chairman of the underground system committee and the engineering section. I am a member of AIEE and the Kiwanis Club, being a past president of the San Jose Kiwanis Club and a past lieutenant governor of Division 12 of the California-Nevada district. I am a past master of Friendship Lodge No. 210, F. & A. M., and a past patron of the San Jose Chapter No. 31 of the Eastern Star. My hobbies are my work, my friends and my fraternal interests. I am married, have two sons, a step-daughter and two grandchildren, and my name is: See page 70.

# California Promotional Leagues Merge

## Reports from leagues, societies and bureaus indicate plans to go ahead

MERGER of the Electric Appliance Society of Northern California and the Northern California Electrical Bureau, to operate from a single headquarters in the Western Merchandise Mart, San Francisco, with very much the present staff, but with a concentrated program aimed to assist dealers, distributors, contractors, wholesalers and manufacturers in whatever marketing programs, educational activities, adjustments to the new conditions may be desirable, has been announced by O. R. Doerr, chairman of the executive committee of the Bureau. The plan was ratified by the board of directors of the Appliance Society at a series of special meetings at which the details were thoroughly thrashed out.

New name will be that of the Northern California Electrical Bureau. However the appliance section, one of four new sections, will be autonomous in the operation of its appliance campaigns and promotions. Other sections will be a wiring section, lighting section, and educational section. All will be under the general supervision of an executive committee and a larger board of directors composed of representatives from manufacturers, wholesalers, retailers, contractors, the utility, and others in the industry at large. The directorate will include the executive committee, representatives of the four sections, and each of the units.

Units, as in the previous Appliance Society set-up, will be established in each community or trading area in northern and central California. Within these units may be set up the four sections or such section participation as is desired locally.

Advantages of merging are set forth as: (1) elimination of duplication, (2) improved efficiency, (3) saving of time of prominent executives whose counsel, assistance and interest are needed, (4) more economical operation, (5) promotion of harmony and showing of interdependence within the industry, (6) broadened scope of promotional and educational activities.

Financing of the new organization will be from dues paid by manufacturers, wholesale suppliers, contractors' organizations, and the utility, the latter on a basis of 2 to 1. Such dues are for the support of the administrative and educational functions. Promotional activities of the appliance section, it is proposed, will be supported from some form of "sticker plan" raised from retailers and suppliers of appliances bearing stickers, augmented by the utility, each group bearing a third of the cost. Units will raise funds for any special contests or activities from among unit members.

Appointment of the manager for the bureau and selection of the personnel of executive committee, section committees, and board of directors was not yet ready for announcement at press time.

### Northern California Electrical Bureau

"In the field of commercial wiring and lighting modernization, work will consist mainly of survey and education and sale of a carefully planned job for the time when materials are available. This effort for the most part will be directed at retail stores. Even under present emergency conditions, we find them very modernization minded, and it is only the priority situation that prevents many a job from going ahead. We must keep these prospects all alive for the future. Already the bureau is assisting a large home furnishing concern with several stores throughout Northern California in planning electrical modernization to be done after the war.

"Wiring jobs under the defense housing set-up, of course, cannot be certified. But here we have a No. 1 job to be done to see that the maximum number of outlets on which priority will be granted is installed. A survey just completed on 50 homes being built on priority discloses just what we suspected. Speculative builders have cut the number of outlets down to an average of 20, whereas some 36 would have been permitted. Our plan to combat this is to issue detailed electrical layouts that will comply both with OPM rules and city ordinances for each major power company division. The plans for San Francisco are completed and we expect to secure approval from the divisional OPM office and the Chief of the Department of Electricity.

"The Adequate Wiring field force will then sell this approved bill of goods to builders and contractors to the end that everyone, including the Government, will be benefitted by getting some semblance of wiring adequacy into these homes.

"An important part of this plan will be to encourage provision for future outlets and wiring that will bring the job up to Red Seal requirements so that at a later date it may be certified.

"In the field of lighting education, we find that the demand for basic principles is greater than ever before. The Northern California Electrical Bureau has done more along these lines, thanks to the fine work of Clark Baker, than many similar organizations."—*Walter C. Heston, acting manager.*

### Electric Appliance Society

"At the present time we are endeavoring to formulate plans that will be flexible enough to fit the picture, although at present the picture is not encouraging as to merchandise supply. Regardless of the outlook we will make every effort to be of service to the appliance dealers and distributors in whatever way we can. This much is certain, someday there will be peace and our job will be clear. To retain the position of the appliance industry to the best of our ability will be our aim so that when the war is over we will all be ready for the big job that will come with the reconstruction.

"By close contact with the dealers

This window at Nathan Dohrmann in San Francisco was a winner in the home lighting contest sponsored by the Electric Appliance Society of Northern California

and distributors the society hopes to go to work on any program which they want and need and which can be done better cooperatively than singly."—*R. W. Hurf, managing director.*

## Fresno Electric Appliance Society

"After a thorough discussion of conditions and possibilities for 1942, the Fresno Electric Appliance Society, composed of dealers, jobbers and utility representatives, has decided upon a program of selling hard but smartly during 1942.

"Winning the war is a big job. Merchants are trained to do business from day to day under such conditions. Mr. Bopp, the president of the society, has a program outlined whereby advertising and sales promotion will be carried on as near normally as possible with emphasis on that merchandise which is freest in the market. This program is to be kept flexible so that it can be adjusted from month to month, week to week and almost day to day if necessary.

"It is the feeling here that the electrical merchants are fully capable of meeting any emergencies, either in construction or merchandising, but half the battle is knowing what conditions you have to meet, so the society's program is to keep its members well informed, stocks adequate but not cumbersome, advertising ample but not wasteful, to control accounts receivable, to increase service and repair departments and make them profitable and to do our part in meeting the emergency by being constructive factors in a changing, emergency market.

"Timely reporting of conditions and how the industry in other areas is meeting present conditions reported through ELECTRICAL WEST will certainly do its part to help us in our program this year."—*K. L. Hampton, Secretary.*

## San Diego Bureau

"Even though the events of the last few days indicate that brother Nelson is prepared to knock appliance production for civilian use as cold as a cucumber, if necessary, we still feel it is our duty to help dealers move the large stocks of appliances on hand. Consequently we are running an advertisement over the signatures of our board of directors pointing out that adequate stocks are still available on convenient terms.

"Then we expect to run the first of a series of appliance advertisements stressing a combination of sales, service and use. This first covers waffle irons. It pictures a dozen unusual uses, other than making ordinary waffles. An offer of a free recipe book is to go with it. Here we play up the things a waffle iron will do, suggest that out-of-order equipment be put in service and end with the suggestion that a new one can still be purchased. Later other types of equipment will follow.

"We all realize that the entire outlook changed after Dec. 7. Up to that time there was every indication that major appliances, at least, would be more plentiful than buyers; now this seems problematical. Supplies, however, will not disappear. An informal survey of major appliances on hand in San Diego county revealed many dealers with the equivalent of six months stock. Distributors too, were not cleaned out by any means.

"The first quarter, probably the first half of 1942, will find most dealers in position to fill orders for all comers. This will be a period when the most aggressive sales effort will be necessary to overcome buying obstacles that have already held them back during the past three months. The rapidly approaching impact of income taxes, plus the threat of what incomes will be assessed later in 1942 will make selling an art as it used to be "away back when."

"In view of the greatly changed conditions the bureau sponsored promotions in the interests of all must be adjusted to conform to these conditions, but our program for 1942 will definitely go forward in the most powerful manner possible. Direct and indirect programs designed to help dealers move merchandise will be undertaken as aggressively as ever.

"Much emphasis will be given to activities that may help bring customers to dealers stores. Wherever possible assistance will be given to help maintain the merchandising and sales equilibrium on an even keel. During the first quarter at least, with many dealers overstocked, it is going to be very important to maintain standard prices and merchandising practices."—*J. Clark Chamberlain, secretary-manager.*

**San Diego Bureau is running ads like this one, stressing sales, service and use**

## Electrical League of Utah

"At the end of 1941 there was some question as to whether the league should be continued and if so, on what scale. Industry members of our area have had a number of meetings for discussion of this problem and I am happy to report that league operations have been set up to continue virtually as heretofore. The budget has been reduced slightly.

"Adequate wiring activities naturally must be drastically reduced, promotions of all kinds are out, but it seems to be the very definite consensus of our industry leaders that our association should continue to carry on. We are already serving our members with considerable information on priorities and defense housing requirements.

"An appliance store managers' conference is being arranged. This will bring the majority of the Salt Lake City appliance store managers together for conference discussions regarding operations of their businesses during the war period.

"It seems to us that the distributors and dealers are the forgotten men in the present state of affairs. With the curtailment in the manufacture of electrical appliances, electrical distributors and dealers are being forced to adjust their operations in accordance with conditions and these adjustments must be set up in such a manner that they will be flexible so that readjustments can be made with a minimum of disturbance. With all of these restrictions and new policies we must not forget that we have, at least in the defense areas, a very large market that must be taken care of.

"In the Ogden-Salt Lake area the housing shortage is becoming more acute every day. We have had an enormous influx of workers for our defense industries and we are only in the early stages as yet. Several thousand new homes will be required and plans are now in formulation to proceed as soon as weather will permit. Homes which are insured through FHA will have fairly good electrical systems as our local FHA office, up to now, is continuing to require wiring installations in accordance with the FHA specifications. On homes which are being financed through private channels there will, of course, be no wiring standard to follow and several instances have already been

(Continued on Page 57)

Electrical West

# Business Guide

For Electrical Dealers and Salesmen

## Hot Water IS Home Defense

Turning the home over to aid in the war and defense program means that the less attention the ordinary housekeeping takes the more time can be given to war work. That's why the all-electric home is so lucky, it can almost be left to run itself.

Now, nobody is crazy enough any more to imagine that there is available for sale all the home appliances necessary to convert the homes of your town to all-electric operation. Neither are things so bad **yet** that there are absolutely no appliances to sell. That may come later, but at least the dealer who has stock, and most dealers have, needs to sell that stock, whether he ever gets any more later. That is why he bought it himself—to sell.

All the publicity to the war production program has very properly warned the public of the curtailment of appliance production, of complete conversion of appliance manufacturing plants to war industry. There is no doubt but that before long all appliance production may be similarily stopped.

But let's sell what we have on hand to make the home defense job easier and thus add its bit to the war job. No need to sacrifice it in panic. It is fully worth its price and should be sold that way.

True enough, selling is tougher right now. People are half afraid to buy, for fear it isn't patriotic. Down payments must be big. Terms must be shorter, payments more. Installation may be a real problem because wiring materials are restricted even more than appliances. Like the appliances themselves they must be sold out of stock and may not be replaced.

Plenty of the old "sales resistance" plus some brand new. But that's a challenge any good salesman will relish.

With the electric water heater there are so many home defense reasons to put to the customer that a good salesman can take a pride in doing a patriotic deed to sell a family a water heater. No kidding, there is hardly another appliance that is as essential as the one that furnishes hot water. None, certainly, that contributes more to the health and strength of the family to which it is sold.

It offers a list of new benefits as well as all of the old ones (see inside) that should help any salesman to overcome the tougher sales resistances of today. For any family engaged in war work and where all members are apt to be busy away from home much of the day, the absolute safety of the electric water heater cannot be overemphasized, nor the comfort of its ever ready supply of hot water when pa or son come home from the factory, mother or sister from Red Cross work, or even junior from the Boy Scout paper drive.

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March, 1942

# War Reasons for Electric Hot Water

**Use these to sell the stock you still may have on hand**

A new way of life is coming along, sure enough, in this country, a way of living that means more work, more service to the country, more time at home. It is a time when **hot water** is going to be needed as never before. Picture it this way—

**The men of the house** who are not actually in the armed forces are all going to be working, longer hours, harder work, getting grimy, feeling fagged out at the end of their strenuous shifts or day's work. They will need the relaxation, refreshing, cleansing, sanitation that automatic hot water alone can furnish.

**The women of the house** are more apt to be working too, to need the same services from automatic electric hot water. If not actually working in defense plants, or driving cars, street cars, doing clerical work, or some other direct production job, they will be busy with Red Cross work, defense training classes, a hundred and one new activities in connection with the war. If they do, they will be away from home daytimes or evenings at such jobs. When they come home to cook and take care of their homes they'll need the thousand helps that an adequate supply of good hot water can give. It speeds every cleaning task, hurries up meal preparation and dishwashing, clothes washing. And in time of illness it is absolutely necessary.

**Even the kids** do more to help the war effort. The boys collect paper and scrap metals—and get plenty dirty at it. The girls do Red Cross training and may even become farmerettes before long. And will they be glad for a warm bath at the end of a day then!

So the **need** for automatic electric hot water will be greater than ever. But that is not half of it. The other half is why it should be sold **electric** in times like these. What are its **special** advantages, both from a **national** and a **personal** standpoint?

**Abundant supply of power** is first. Whatever conditions may be elsewhere, in this part of the country electricity is the most abundant fuel. There is plenty for war production, even the biggest demand in the nation, and a big surplus for domestic use. In fact, compared to other fuels, it isn't necessary to curtail at all. Petroleum products and by-products are already restricted. Solid fuels require transportation and that is being more and more restricted. But electricity is delivered over its own highways, already built and in service, and non-competitive with other users of the rails and highways. Electric water heating, then, is more patriotic than any other type. The available tanks should be sold as a real contribution to national defense.

**Safest of all.** Translate that, and it means absolute **peace of mind** to the user, absolute freedom from attention and hence the ability to put every effort into war work without a moment's worry over the water heater, the fuel, its safety; even if the lines are damaged by bombs, it is safe. Then there's the safety of children left home by a busy mother. An electric is safe enough to install in a

clothes closet, away from air or chimneys, safe enough to be installed and then forgotten.

**Most reliable** under the emergency conditions of today. Other sources of fuel for water heating may be delayed by transportation, curtailed for defense uses, but every effort will be made to keep electricity continuous for lighting, for defense production, for communication and morale. Any damage to lines will get prior repair. The supply of power is greatest of all resources in this region. As for the electric water heater, its performance is absolutely carefree and reliable.

**Economical.** Rates for water heating are the lowest in the land in this region and are apt to stay low longer than any other form of fuel. Shortages, restricted uses, transportation difficulties, labor costs rising, all will be reflected first in other fuels. Electricity, even if war conditions should cause slight increases, would still be far cheaper by comparison than any other service, be soonest brought back down afterward. The record of the industry through the last war proves that.

**Cleanest** in every sense—and that includes the heater itself as well as the hot water service it furnishes to keep the house clean. Certainly it contributes no dirt or soot or fumes or ashes itself to the household jobs that have to be done—despite busy war work. In fact it removes many of the causes of extra housework.

**It's Quiet**—if quietness is desirable in a refrigerator, it is in a water heater and the electric water heater makes no sound whatever. Nor does it make odor. Socially it is unobtrusive and modest, artistically it graces any space assigned to it, even in the kitchen, so that it need not be relegated to the back porch or the basement.

**Healthful.** Hot water contributes to family health and fitness. Bathing is convenient, pleasant and beneficial. Hot water sterilizes dishes, clothes. Hot water in time of illness is needed in a hundred ways. Hot water is a beauty aid as well. Warm baths are restful to tired workers, they aid sleep in restoring the war worker for the next day's job.

**Long lasting.** The well made electric water heater is a long term investment. It lasts longer than types of equipment subjected to high temperatures and service costs are almost nil for years and years. These qualities add to the resale value of a house equipped with an electric automatic water heater.

Such are the special advantages and reasons for electric water heating and for the sale thereof in these war times. Certainly all the stock available or made should be sold to the American public today as a genuinely patriotic service, one that contributes a lot to the war effort.

**PUGET SOUND POWER & LIGHT CO.**
**PORTLAND GENERAL ELECTRIC CO.**
**CALIFORNIA OREGON POWER CO.**
**UTAH POWER & LIGHT CO.**
**IDAHO POWER CO.**
**ROCKY MOUNTAIN ELECTRICAL LEAGUE**

# Credit Granting That Pleases People

**Third of a series of good sense articles on business management**

**by Ken Hampton**

**How much ADDITIONAL sales volume must be obtained TO OFFSET CREDIT LOSSES?**

This table shows additional sales required, according to the annual net profit earned by the business.

| Percent Profit | Loss $20 | Loss $50 | Loss $100 | Loss $300 | Loss $500 | Loss $1,000 |
|---|---|---|---|---|---|---|
| 1 | 2,000 | 5,000 | 10,000 | 30,000 | 50,000 | 100,000 |
| 2 | 1,000 | 2,500 | 5,000 | 15,000 | 25,000 | 50,000 |
| 3 | 666 | 1,666 | 3,333 | 10,000 | 16,666 | 33,333 |
| 4 | 500 | 1,250 | 2,500 | 7,500 | 12,500 | 25,000 |
| 5 | 400 | 1,000 | 2,000 | 6,000 | 10,000 | 20,000 |
| 6 | 333 | 833 | 1,666 | 4,999 | 8,333 | 16,666 |
| 7 | 286 | 714 | 1,428 | 4,385 | 7,142 | 14,285 |
| 8 | 250 | 625 | 1,250 | 3,750 | 6,250 | 12,500 |
| 9 | 222 | 655 | 1,110 | 3,330 | 5,550 | 11,110 |
| 10 | 200 | 500 | 1,000 | 3,000 | 5,000 | 10,000 |

CREDIT is the symbol of civilization. Every credit transaction stands as a vote of confidence of man in his fellow men. Barter is only carried on in those lands where people distrust each other, because as soon as trust and confidence is established between people, it leads invariably to the acceptance of a promise to pay at a later date.

All business transactions start and end with cash. If they end with more cash in hand than they started with, they are successful. If they end with the same amount or less, they fail. The right financing plan is vital to any business. Customers fear and distrust financial operations they do not understand. When it comes to the financial end of any transaction, both parties must thoroughly know what is expected of them.

To assure the completion of the transaction and its profitable return in cash, it is important to the seller that he know the risk he is taking when he extends credit, because he is parting with the product of his labor. Parting with money is equally important to the purchaser, as he is giving up his savings for goods to be used or enjoyed. Between them there must be confidence and understanding.

The extending of credit rests upon character as well as financial or earning capacity. Character is the guarantee of justice and fairness in all credit relations. Permanent success in granting or receiving credit cannot be divorced from character.

It behooves the merchant to have a very definite credit granting policy and put the granting of credit into the hands of capable, well trained men of proven judgment. The policy he adopts must be fair so that he will merit the confidence of his customers.

Financing must be easily understood. The time, place and manner in which the goods delivered are to be paid for must be thoroughly understood when the credit sale is made. The customer to whom the merchant extends credit becomes a friend in whom he believes and upon whose word he relies. It is especially important that this be remembered by the merchant's office staff when it becomes necessary to remind the customer of his failure to pay his indebtedness. He is still a trusted friend and should be addressed as such. Even in his delinquency, he should still be dealt with courteously. If firmness is necessary, it can be applied with the same courteous understanding with which a friend one is disappointed in is corrected or advised.

In checking the financial efficiency of his business, the merchant will do well to consider the following points:

1. **What terms on charge and installment sales are customary in his industry? Further, how can he use customer terms to best help his business please people and grow?**
2. **Can he grant these terms without jeopardizing his capital?**
3. **What terms, if any, can he grant without charging interest?**
4. **What rate of interest should he charge?**
5. **Should he extend the same terms on all merchandise offered?**
6. **Since his object is to get back cash, is there any way he can transact all of his business profitably for cash and not grant any credit?**
7. **What terms will be most advantageous to him and his customers? He should never hesitate to adopt terms to his specific locality. Such things as pay days may be very vital to his customers' paying convenience.**
8. **Has he a satisfactory method of getting information on prospective customers' financial standing and paying habits?**
9. **Are his accounts receivable and credit records well enough kept so that both he and the customer are fully informed at all times about the account?**
10. **Are prices and terms stated on copies of invoices and contracts given customers?**
11. **Are there any features about his credit policy or terms that should be featured in his advertising?**

Nineteen forty-two is a year in which we should beware of over-extending credit. It is a year during which there will be great displacements of people to meet industrial needs as well as active military requirements. **War is always accompanied with a diminishing respect for obligations.** High earnings will lead workers to make commitments for purchases far in excess of normal requirements.

These conditions should be recognized and losses guarded against by careful investigations before credit is granted. A good rule to follow is to grant credit on the basis of **normal** earnings rather than inflated wartime earnings.

It will be well to double reserves for bad debt losses in 1942 to provide for the unusual risks that will attend operations in spite of the most careful planning .

called to our attention where independent contractors are taking advantage of war conditions to the extent that electrical systems are being installed which are incomplete. In my opinion this is one of the big problems which the industry is facing today and associations such as ours have a tremendous task ahead of them in selling the idea of proper wiring and assisting those who are not familiar with the procedure of priorities.

"We have already had a number of appliance dealers close their stores in this area and no doubt there will be more. Those who are in a position to continue on indefinitely seem to be very receptive to working with one another in solving their common problems."—*Elias J. Strong, manager.*

## Rocky Mountain Electric League

The Rocky Mountain Electrical League embarked on a greatly expanded program at its mid-winter conference of the Utility Division, Jan. 15-16, in Denver, by placing the organization on a complete wartime basis and establishing itself as a self-contained defense unit.

Under leadership of its new president, J. W. Alexander, the power company executives present "reconditioned" RMEL to meet drastically changed conditions by appointing three committees: priorities; defense energy supply and power allocation; and industry coordination, each manned by top-flight utilities, contracting and manufacturing officials, which will dominate all future league activities "for the duration."

All of the major electric utilities in Colorado, Wyoming and New Mexico were represented at the meeting; and power companies in Montana and South Dakota sent delegates. By unanimous consent, they agreed to pool all their resources—equipment, stocks and other inventories—and list them for reference at League headquarters in Denver which will be the clearing house for transfer of surplus supplies from one concern to another where a shortage may exist.

Current function of the league is to collect all scrap metal from utilities in Colorado, Wyoming and New Mexico, with a view to routing it to the Colorado Fuel and Iron Co.'s big reduction plant and rolling mills at Pueblo, Colo. This assignment came from Guy W. Faller, president of Public Service Co. of Colo., who was recently appointed regional representative of the industrial conservation committee, local branch of the national industrial salvage section, Bureau of Industrial Conservation. Faller's authority covers all public utilities except railroads (including electric, gas, water, and bus lines) and charges him with responsibility of assembling iron, steel and

GEORGE E. LEWIS

scrap metal for conversion into implements of war. He is working through the RMEL, because that organization is now set up to handle such assignments, having appointed new committees with broad powers to act in any capacity that involves public utility cooperation with government war agencies.

The league also is energetically engaged in the task of inventorying electric utilities of the region to discover the location of surplus equipment available for transfer, exchange or sale to companies in need of such supplies. This falls within the scope of RMEL's materials and equipment exchange committee, chairmanned by George E. Lewis, league manager. Lewis' letter to executives of member companies states: "The plan entails furnishing league headquarters with lists of still-good materials on hand which may be transferred to some other company that may have need for them, either through trade or outright sale. Such sale or exchange is permissible under P-46 provisions of priority regulations. It applies to materials in or out of stores. Each member company will have a list."

This clearing house program is expected to relieve pressure already felt on utilities whose orders for materials have been delayed by priority routines.

Under the new setup, merchandise will be subordinated but none of the many promotional enterprises scheduled for 1942 will be sacrificed.

George E. Lewis, executive secretary, will be in charge of the revised program. His duties encompass the promotional work he has previously done in addition to serving as contact man between committees and with government agencies. To accommodate the need for more room, League headquarters moved from the tenth floor of the Gas & Electric building, Denver, to the fifth floor where office space three times that of the old location has been provided.

There will be no curtailment of meetings.

## B. C. Electrical Service League

Operations of the Electrical Service League of British Columbia met with outstanding success during 1941, according to R. Hall, secretary-treasurer.

Looking at the year from the standpoint of electrical contractors 1941 generally speaking was a good one. New homes built, coupled with industrial and commercial activity was responsible for increased business.

Vancouver city electrical department continued its resurvey work on older buildings, in most cases revealing inadequate wiring and leading to considerable new wiring.

The league has maintained close contact with the Vancouver Electrical Assn. Hall declared, prices for wiring contracts were better last year, and despite difficulty in securing good attendances at meetings owing to the very heavy volume of business, the executive of the association placed the organization in a sound financial condition and cleaned up many of the contractors' problems. During the year the league turned over to the electrical association installation work on ranges for the power company amounting to $20,512, a gain of $4,537 over 1940.

In the realm of Red Seal wiring a total of 991 certificates was issued to new homes in 1941 as against 604 in 1940 and 427 in 1939. Despite the lack of expensive homes a 60% gain in certificates issued was recorded.

In the field of commercial and industrial lighting many installations of both incandescent and fluorescent lighting were made, the greatest development being in the fluorescent field.

There has been a steady enquiry at league offices for information on improved lighting conditions, and while fluorescent has been very much to the fore there have also been many fine installations of semi- and totally indirect lighting jobs. Store and office lighting have predominated in the use of incandescent.

In the industrial field, Hall explains, fluorescent light has become the accepted thing, and no difficulty is encountered in having some excellent installations made. Blacking out of factories due to advent of the war on the Pacific has further directed attention to artificial lighting, and further growth along this line is anticipated as the war continues.

Promotional efforts of the lighting service staff of the league in the realm of residential lighting were also gratifying. In all 3,526 calls were made and 1127 demonstrations given.

Due to war conditions the activities of the home appliance council of the league was cut short, but it achieved much success in the early part of 1941.

# Store Employees Get Lighting Pointers

That such active merchants as department and furniture stores realize the inter-relation of good lighting, both in the home and in the store, and the sale of their merchandise was given further support when Hale Bros. stores inaugurated a series of four lighting classes in cooperation with the Northern California Electrical Bureau. Breuner's stores had just previously held similar classes for its department heads in the appliance, lamp sales, advertising and display, and engineering and maintenance departments. Both programs came about as a follow-up of the tour made by Clark Baker, lighting counsellor for the bureau, addressing meetings sponsored by the Western Retail Furniture Dealers Assn.

Employees from the lighting departments, draperies, advertising and window display departments of Hale Bros. stores in Sacramento, San Jose, Oakland and both the Market and Mission St. stores in San Francisco, met for four consecutive weekly lighting classes held at 447 Sutter St., San Francisco, beginning Feb. 11. In all 35 attended the classes, the management paying for dinner and traveling expenses and making provision for the time.

First three meetings were conducted by Clark Baker, covering and demonstrating light sources, brightness, visibility, visual acuity, color and the application of equipment. The final meeting was addressed by Miss Goldien Marble, lighting counsellor on the staff of the Electrical Appliance Society, and Miss Nancy Jane Cox, home lighting advisor of the Hale Bros. stores.

Following the preparation given its personnel for lighting sales and the application of lighting knowledge to other sales, Hale Bros. opened up on Feb. 27 an extensive light conditioning department at its main San Francisco store. Three times as much space as previously will be devoted to lighting equipment and service. Display rooms showing the application of light conditioning to various rooms, the optometrist of the store and a lighting advisory service to the public are being combined. Similar displays will be extended to the four other stores after the first is opened.

The previous meetings at Breuner's, Oakland, were held in December at which time were present the store owners, inter-building executives, key buyers of three departments and the advertising executives. The meeting was devoted entirely to light fundamentals, engineering, equipment and installation. Not only the company's sales program for the sale of portable lamps was affected by the results of the meeting, but store relighting and its advertising program likewise. Although priorities on materials for an immediate relighting program may not be available, intelligent planning of future store policy will undoubtedly take lighting into consideration.

Clark Baker conducting first lighting session for Hale Brothers employees

## "Freeze" Order

Refrigerators were "frozen," a ceiling was put on washers and ironers, but radio, refrigerator and other appliance parts to maintain and repair existing equipment were authorized in the latest moves of the War Production Board during February.

Refrigerators were the first appliance actually frozen much in the same manner as were automobiles. Manufacturers' stock and those of distributors were frozen and it was announced that all refrigerator production would stop after April 30. Retailers, however, are to be permitted to sell stocks on hand up to a maximum of 100 new refrigerators, or a number equal to one twelfth of their total 1941 sales, whichever figure is larger, before the freeze order applies to retail stocks.

A subsequent order assured the public it would be able to buy spare parts to keep household appliances operating after they are unable to buy new.

Meanwhile, home washing machines and ironers were placed under a price ceiling by Leon Henderson. The order prohibits selling washing machines or ironers at prices above those in effect between Oct. 1 and 15, 1941. The order also restricts manufacturers from making changes in specifications or designs in order "to protect public against indirect price increases through deterioration of quality or performance of the product." No new models which were not in process of manufacture between Oct. 16 and Feb. 8 will be permitted. This was the fifth price order issued; earlier orders had put ceilings over radios, automobiles, wool floor coverings, and cooking and heating stoves.

Manufacturers of radios were likewise cut off from all civilian production except for repair parts. Total volume is now to go into producing of radio and sound equipment for the Army and Navy. Most of the washing-machine manufacturers have been converted to full-time war production and the same program is scheduled for all refrigerator manufacturers. Stocks on hand on the Pacific Coast and the mountain region seem to be reasonably large, however, to carry dealers over for several months.

Many authorities are advising dealers who have any potential or actual ability to get into war production jobs to close their businesses for the duration. The nation needs the trained manpower and this voluntary liquidation will narrow down automatically to fewer dealers the ability to survive. In this way, those incapacitated or over age may carry on what civilian business is left. It is pointed out that if the war should stop it would still take the manufacturers some months to retool and get back into appliance manufacture since they have so completely changed over their plants and equipment for war business.

● Discussing Methods of adapting sales programs to the wartime economy, officers of the General Electric air conditioning and commercial refrigeration department held a regional meeting in San Francisco Feb. 9 with distributors and members of the sales organization. Dealers handling General Electric appliances throughout the mountain states were given the 1942 program of General Electric by General Electric Supply Corp. and G-E factory representative in meetings held at Salt Lake City and Boise. J. A. Kahn, district manager, and Will O. Smith, district sales manager, conducted these meetings assisted by B. S. Wells, R. C. Padget, Jr., R. E. Lyford and Paul Wilmore from the factory. Special emphasis was placed upon the market opportunities of the new electric blanket.

● A 16-page "Manual of Electric Cookery," designed exclusively for home economists, has been published by the Electric Range Section of NEMA, with the idea of bringing an up-to-the-minute resumé of information covering electric ranges and electric cookery. The booklet also ties in with the government's present nutritional defense program, covering the scientific principles of cookery by which vitamins and minerals are best retained.

R. A. Montgomery, left, general manager, Montgomery Electric Co., Portland, and his partner, G. H. Card, sales manager, former utility salesman

# Diversity for the Emergency

"Contractors," said one once, "have backed away from most of the business they once started." But this is not true of Montgomery Electric Co. of Portland. It is moving into many lines and services that contractors have dropped. In doing so it is fortified by a diversity of business no matter what happens to any single line in this war emergency

Believing in advertising, as this full page ad attests, the company reminds of the complete sweep of its service, from installing raceways for Bonneville power house to home convenience outlets, appliances, fixtures. Montgomery himself handles large installations

A dishwasher sale led to rebuilt cabinets, then steel cabinets, then a change of range and ended by selling a doctor a complete kitchen (above) if it could be installed in a week. It was.

Store, at 1001 SW Fifth Ave., is compact, well lighted. Displays are kept fresh. Basement space for the shop and warehouse covers nearly a quarter of the block. It is carefully departmentalized for quick access and complete accounting. Stock is as diverse as the various services this company performs

George Kelley (right, top) is happiest in direct selling. For years at Portland General Electric Co. he was ace appliance salesman, then kitchen specialist, running its kitchen service bureau. Of late years he was dealer contact man, but he really liked selling best. He was appliance specialist for General Electric Supply, but he is happy again to be kitchen and appliance specialist at Montgomery's where he can really do his stuff. Clayton Card (right, below) is the fixture specialist, residential, commercial or industrial. Besides wiring, appliances, household fixtures and floor lamps, the firm goes after store and office lighting, floodlighting, theater control, industrial and factory lighting. It has designed a fluorescent shielded fixture of its own. It contacts doctors and dentists for special lighting applications. (The doctor whose kitchen is shown above wanted a strong spot light over the sink for close examination of vegetables.) W. J. Matson is city superintendent, handling contracting and maintenance work. George Card specializes in commercial lighting and major appliances. He has found, he says, that the opportunities for increased service to a customer are ignored by most contractors

**ELECTRICAL WEST**

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## *CNX Ghost Arises*

REFORMERS never say die. Turned down a dozen times, the ghost of a reform rises to haunt again. In times of stress, when everyone is busy at some bigger task, the ghost comes back in disguise and sometimes succeeds for a time in getting a foothold. Prohibition, put across as a military necessity during the last war, is the classic example. But Ickes forcing San Francisco into municipal ownership, and sneaking in several power projects previously turned down by Congress, under the cloak of conserving natural resources for war, is this war's reform ghost. Civilian defense used as a cloak for cooperatives and social luxuries sponsored by the social-minded wife of the president, is another example.

In the electrical industry the group who have sought the reform of wiring by a zealous and sometimes out of proportion sponsorship of concentric wiring, have arisen like a ghost now to put over what the industry has previously shown so strongly it did not want. Under the guise of conservation of war materials, CNX wire is up again. Theoretically it offers a conservation of material. Actually, to tool up to produce it is hardly worth its price in manpower and precious tools.

Furthermore, if put over during this emergency it may well suffer the fate of prohibition after the war is over. Isn't this misguided patriotism, to say nothing of poor public and industry relations?

## *Still Fooling with Unessentials*

PUBLIC power propagandists and "specialists" continue to insist upon hooking their pet chariot to the blazing star of the war program. Social planners and public spenders still insist that their pet projects are essential despite the call for an all-out effort to win the war. Until these things stop, there is every reason to challenge statements about unity of purpose and sincerity of motives.

Two examples of jockeying with facts relating to the war program so as to secure more federal money for building electric facilities to compete with existing utilities are reported in the news columns of this issue. Secretary Ickes suggests 17 "sample" power projects as part of a scheme for strategic mineral development in the West. Included are a 50,000-kw. steam plant at Sacramento and a 150,000-kw. steam plant at Newark (this presumably is replacing the Antioch CVP steam plant). Neither of these plants has the remotest connection with producing strategic war minerals. The second program is proposed by the Bonneville Advisory Board. One proviso calls for the purchase of the Puget Sound Power & Light Rock Island power project. It is typical of the drive to break up Northwest power systems. How it would promote the war effort is something for speculation. Both of these examples are typical of how patriotic camouflage can be perverted.

## *Wages Won't Win the War*

BUYING our way out of this war would be a wonderful way to win it, if it would work. Unfortunately we are fighting enemies who buy ten times more war per dollar than we can for the same money, and if it comes to a buying war, we will be cleaned long before the enemy are, even if we start with a bigger roll. What it amounts to is that our money is "Mex," and only worth ten cents on the dollar in the amount of work it will buy. For it is *work* that will win the war, not money. Our enemies get their work for almost nothing in cash. We have to pay a very high price for work, by comparison.

It is blind ignorance or indifference to this reality that is little short of criminal which permits labor leadership to seek further wage increases at the present time. Such leadership exposes a lack of penetration and ability to take on responsibility that falls in line with the very criticisms of labor which have held it back in the past. Labor leaders have worked hard to live down the accusation that they were a mere racket, that theirs was an attitude of "gimme" for which there was no give in return.

True enough, costs of living have gone up, but

increased labor costs are almost entirely responsible for that. New wage increases will only make them go higher. These costs are part of the cost of a war. Raising wages, instead of settling down to pay for the war with less abundant scale of living, will only make the dollar worth less. When the dollar is worth less, the cost of war goes higher.

There is just no escaping the price of war by such manipulation of money. War costs us all less food to eat, less luxuries, less clothes to wear, less automobile rides, less movies to see, more taxes to pay. Hiking wages is only to kid ourselves. It is the responsibility of labor leadership to make this clear to its membership. Managements and plants have virtually been drafted and have nothing to say. Labor is still free and if it too does not wish to be drafted and lose its freedom, it should voluntarily assume this responsibility to contribute more work and not ask for more pay.

## *Keep the Streetlights Burning*

"DON'T kill our workers!" is a slogan plastered on countless billboards in a national appeal to reduce traffic accidents. Yet in the very communities where accident tolls mount, there is loose conversation in some instances and earnest recommendations in others that street lighting be reduced or restricted. Arguments range from fear that blacking out will not be accomplished quickly in case of air raids, through suggestions that scarcity of critical materials necessitates curtailment, to finally the need for conserving electric power.

All of these claims are specious. The street lighting industry began substituting for critical materials long before America declared war. Blackout control has been perfected. In Los Angeles, which because of geography and electrical layout presented the severest test, 90% of the 90,000 street lights were dark within four minutes of the first air-raid warning signal during the latest blackout. Moreover, any possible momentary token air raid could not accomplish as much damage as might the darkening of all the well-lighted streets during all the other hours of the year. In the entire United States the total amount of electricity used for street lighting is less than 2% of all the energy produced. War time (daylight) savings can conserve almost that much electricity.

Facts such as these presented to city councils, newspaper editors and civic organizations should quiet the talk of street lighting reductions. If they do not, then a clinching reason for keeping the street lights burning is the opening statement of the IES Street and Highway Lighting Committee report:

"For an expenditure averaging $1,000 a mile along about 200 miles of hazardous thoroughfares, a handful of American communities over periods of from one to four years have experienced 195 fewer traffic deaths, 3,474 fewer traffic injuries, 7,304 fewer property damages, and a saving in accident costs totalling $5,891,000!"

## *The Pioneer Spirit*

THERE is a lesson in cooperation for the federal power proponents in the formation of a statewide power pool in Utah. When representatives of seven municipal and four investor-owned utilities met in Salt Lake City last month to organize facilities and manpower for mutual assistance, they set an example that might well be followed in other regions of the country. Their voluntary agreement contemplates exchange of power in case of damage to any one system and transfer of personnel and equipment if emergencies should require such action. While this happens in Utah, the Bonneville Administration ignores suggestions that interconnections with the private systems in the Northwest would provide similar benefits. Pooling of all power resources in that area would release an additional 100,000 kw. of needed capacity. But the pioneer spirit of mutual aid that built the West and is reflected in the Utah agreement seems foreign to the federal agency.

*FROM this moment we are engaged in a victory program. We can talk and act no longer in terms of a defense program. Victory is our one and only objective, and everything else is subordinate to it. It is clear that a vastly expanded national effort is imperative. Production schedules for all manner of military items must be stepped up at once. Every activity of our national life and civilian economy must be immediately adjusted to that change. To attain victory we aim at the greatest production that is physically possible; we call for the greatest national effort that can possibly be made. This policy applies all down the line—in the agencies of government, in industry, in agriculture, in commerce, in labor, in every phase of national life. There is but one standard for activities in all these fields—the simple question, "Is this the utmost that can be done to bring victory?" Policies and actions which meet that test must be adopted; those which do not must be rejected. A united people will harness the unparalleled might of the United States to one word and one slogan—VICTORY*—Vice-president Wallace.

# "Ten Silver Months . . ."

"EVERY WEAPON *we make today is worth ten that we might produce next year; for this year—1942—is the critical year in the existence of the United States.*"

This grim challenge was thrown at American industry by Donald Nelson in his first speech as chief of the War Production Board. He was speaking to a group of business paper editors, called together to receive at first hand Mr. Nelson's urgent message to the industries they serve.

"We've wasted the golden months", he declared, "the months in which we could have expanded our steel industry, our chemical industry, our copper industry, and all the others, so that we would have plenty of everything. But we still have ten silver months—the months that remain in 1942—and in them we can do things that we never thought possible."

To that objective Mr. Nelson has dedicated his high talents and boundless energy. And to that task he asks American industry to apply the full measure of its resources and skill.

That challenge should be all that it takes to exact from industry the last ounce of its energies. For by now we all can see that in this war the American way of life is at stake. American industry is the essence of the American way of life. Neither can survive without the other. So, even if it had no better reason, industry must go all out to win this war as a measure of self-preservation. Here self-interest and patriotic duty are synonymous. American industry cannot afford to let America lose this war.

The 1942 job is crucial. If it is well done we have a chance to win. If it is badly done we cannot possibly win. There is the measure of the responsibility that now rests upon the shoulders of industrial management.

It is not just Donald Nelson who asks this of industry. He speaks for the millions of fighting men—on land, at sea, in the air—the world over, whose eyes turn so desperately to the workshops of America. There and there alone can they see the hope of victory.

*The people of America are not going to let those men down. They demand of industry every effort and every sacrifice that may be necessary to back them up. On that score, American industry stands, of necessity, on trial before our people. It must come through—or else!*

* * *

As industry goes all out to meet this demand, its management asks of those who set its tasks and supervise its performance the utmost possible cooperation. It asks of them specifically an understanding of its problems and a chance to work them out without unnecessary interference. It asks for protection against attack from the rear while it concentrates its energies against the common foe. It asks a truce on economic reforms and social experiments that have nothing to do with winning the war and that are bound to arouse misgivings and mistrust amongst the proprietors of industry. Above all, it asks that it be not made a political scapegoat for every deficiency that is sure to develop in the confusion of a war effort.

This does not mean that industry resents honest criticism or constructive direction. Neither does it mean that it is unwilling to do its best unless it can have its own way in all things. The managers of industry are practical men. They know better than anyone else that unprecedented conditions call for new methods, that they must be open-minded to every criticism sincerely directed toward winning the victory. They know that no one can afford to be smug in the face of a national crisis.

There would be no point to my rehearsing here the pros and cons of such criticisms. Time is too short for that. Only in its performance can industry write a convincing answer to its critics. But as a help toward the achievement of that performance, I should like to clear up, if I can, one prolific source of misunderstanding and mistrust.

I refer to the solicitude of industrial managers as to where their companies may find themselves after the war. *This concern for the future sometimes is misinterpreted to mean that management is blind to the urgency of the present. But it does not mean that. It is a perfectly natural anxiety that must be felt by any responsible management operating under the American enterprise system—which is one of the things we are fighting to preserve.*

Under our system, the managers of industry cannot but feel a sense of responsibility to its owners, not merely for current dividends on their investments but also for the conservation of their properties. That means they must feel some concern for what may happen after the war to a business that now must go all out for the war. That indeed, is but part of a general concern over what may happen to the whole American way of life after the war that we are fighting for its preservation.

To give practical effect to that concern under present conditions is one of the problems of management. It is not an insuperable problem. Competent management will be able to surmount it, I am sure. But the right kind of help from those in authority can make the job a lot easier. And let us note in passing that the problem cannot be written off, as some critics of business seem to think, merely by setting off against it the profits that business can make on war contracts. That misses the whole point.

For a business enterprise is not, as many seem to think, just a "profit-machine." It is not set up and operated by its owners and managers for the sake of this month's or this year's profits, without regard to any other consideration.

The fact is that any worth-while business must operate as a going concern. It consists not only of stockholders and managers, but also of employees, markets, distributors, and dealers. Mostly, I might say, of markets, distributors, and dealers. They are the "reason for being" of any business, the source of its payrolls and its profits.

No competent management wants to scrap such essential elements of its business just for the sake of war-bred profits, however large they might look . . . at the moment. Most of the original reluctance to get into arms production, for which industry has been criticized, was not due to a "greed for profits", as has been charged. Rather did it arise from management's mistrust of "war profits" that can be made only by sacrificing the essential elements of a healthy business.

* * *

*But now industry faces a dire national emergency. The survival of our country and all its institutions—including American business—is at stake. So management must shape its course to meet without stint every need of the war effort. That means it must subordinate to that effort every*

*other concern. To lose the war is to lose all. We must first win the war if we would save anything.*

To the men of management that presents a grave responsibility. It is fair to ask whether government can do anything to help them meet it. One simple thing I think government can and should do. It cannot dissolve all the concerns of management, but it can help substantially.

Government should do all it can to help management conserve those assets of business that will contribute to post-war reconstruction, when that can be done without prejudice to getting on with the war.

Let me explain. Broadly speaking, every business comprises three elements. One is its tangible assets—its factories, machinery, equipment, and materials. Another is its productive capacity—its management, organization, trained working force. A third is its intangible assets—the goodwill, familiarity, acceptance, and recognition that it enjoys amongst its dealers, customers, and prospective customers.

When the nation goes to war government becomes the one dominant customer of a business. Of these three elements, the first two—plant facilities and organization—become of paramount importance to the job in hand. But so far as the government buyer is concerned, the third drops to minor importance.

But that third element cannot be ignored by the managers responsible for that business. For it will be their mainstay when they must rebuild that business after the war, when government has lost all interest in its existence, except as a source of tax revenue. That is why government can help greatly if now, during the war, it recognizes the legitimate concern of management to conserve those assets that will be essential to survival after the war.

Everyone recognizes the obligation of government to demand that the individual business go all out for war production, to forbid the production of goods not essential to wage war and to commandeer those that are, to require that a business sacrifice its markets and disrupt its distribution organization. No one questions the right of government to restrict arbitrarily the amount of earnings that a business may retain as profit from its war activities. In short, no one questions the right of government to become the dominant partner in any business that may be needed to win the war and, as dominant partner, to put the national need above any conflicting interest of the business.

*But, as it does all this, government should remember that the survival of that business is staked on the public's knowledge and use of those discontinued or commandeered products, on the stability of that crippled dealer organization, on the ability of the business to maintain its standing in a market-place from which, temporarily, it may be barred.*

And government can help management to deal with the exacting task it now faces, if it will do all it can to avert the needless sacrifice of business interests that do not conflict with war needs, if it will but remember that one of these days, that business again will be on its own gathering up whatever resources it may have left, recreating its markets, rebuilding its distribution channels, reestablishing itself as a going concern . . . and doing all this in a competitive world without benefit of war orders.

The only foundation upon which any business can hope to rebuild when that day comes is its customers' memory of its name and their understanding of its products. Whatever credit may be coming to it for its war effort will not avail it very much if it permits itself to be forgotten. Its chief assets in that day will be the identity, recognition, and acceptance it still enjoys amongst those to whom it must look for business.

That is why so many business men, already going all out on their war jobs, become apprehensive whenever some word or act of a legislator or government official seems to question the validity of their sales, promotion, and advertising activities during the war. For they know that it is by such measures alone that any management can hope to conserve—while its business goes to war—the values it will need when it returns to civilian service.

*That is why I ask government to do all it can to allay such uncertainties, to reassure business of its desire to help conserve those intangible assets that mean so much to business security. For that, I believe, will strengthen the hand of management in a big way as it goes all out on the vital job Donald Nelson has staked out for industry.*

* * *

He has told us that if we are to make these ten silver months productive enough to make up for the golden months that are gone, industry must do things it never thought it could do. That is dead right. For America now finds itself in a position it never thought it could be in.

All too slowly, but very surely, it is dawning upon us that this is OUR WAR. Moreover it was our war long before we knew it or did much about it. So our job today is not merely to match the current production of our enemies. That is not enough. We must produce also enough to match the surplus of resources they had built up before we got started. We must produce enough not only for our own needs, but also for all the United Nations.

Moreover we must produce all that we need for *decisive* victory, for anything short of that will mean defeat. If we would save the American way of life, we must destroy once and for all the forces that threaten it. A stalemate would mean but an armed truce and what that might do to the American way of life and to American industry no one dares to guess. Victory must mean *decisive* victory. And this, very definitely, is our war.

*And just as definitely, this is OUR YEAR. For in this year—1942—we must prevent our enemies from achieving an advantage that might put victory forever beyond our reach—despite all our vast resources. It is an appalling fact that victory may slip beyond our grasp—not in 1943 or in 1944—but during the months just ahead of us.*

"Industry's responsibility in all of this is great," says Donald Nelson. "The job will take brains and initiative, but we can do it if we go out with a will."

To Mr. Nelson, that initiative means that industry must lead rather than follow in the march to more intensive use of our machines and our man-power. We dare not wait for new facilities to meet our mounting needs. More and more we must press for more widespread subcontracting and conversion. And he is counting on that initiative, backed by ever more aggressive effort, to avert or to minimize the compulsory measures that now seem imminent.

"We must stop thinking about what we're going to do to the enemy in 1943 and start thinking of what we're going to do to him in March of 1942. We must make today the things we would be making next year . . . if we had the time to spare."

That, says Donald Nelson, is the task of American industry during the next "Ten Silver Months." And to that gigantic task American industry now must bend every ounce of its abundant strength.

James H. McGraw, Jr.

*President, McGraw-Hill Publishing Company, Inc.*

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*This message is appearing in all McGraw-Hill industrial and business publications, reaching over a million readers.*

# NEWS of the industry

## RAVER SUBMITS PLAN FOR 5,000,000-KW. INCREASE

In a program announced by Dr. Paul J. Raver, Administrator of Bonneville Power Authority, and approved by members of the Bonneville Advisory Board, more than 5,000,000 kilowatts may be added to the supply of electric power for war industries in the Pacific Northwest. Details include enlargement of Seattle City Light's Ross Dam; tripling of the generating capacity of Puget Sound Power & Light Co.'s Rock Island Dam; and construction of ten huge new hydroelectric projects in the Northwest.

Raver, who recently returned from Washington, D. C., declares that many civilian industries may have to expect curtailment of power next winter and that at least seven firms, each requiring large blocks of power for war-production use, are planning new plants mostly east of the Cascade Mountains. He points out that the new industries will produce such varied military essentials as ferro-silicon, phosphorus, magnesium, TNT and chlorine.

The proposed power projects include:

1,630,000 kw. at the Umatilla Dam on the Columbia River; dam and powerhouse at a site between Oregon and Washington, above the junction of the Umatilla River; cost $90,058,000.

2. 600,000 kw. at Foster Creek, 56 miles below Coulee on the Columbia River; dam and powerhouse; cost $58,986,000.

3. 90,000 kw. at Detroit prospect, near Detroit, Ore., east of Salem; dam and power house; cost $28,636,000.

4. 540,000 kw. at Priest Rapids, below the Rock Island Dam and 50 miles from Yakima; dam and powerhouse; cost $71,266,000.

5. Increase the storage capacity of Pend Oreille Lake, Idaho, by constructing a dam at Albany Falls outlet. Project would stabilize supply of prime power downstream by aiding regulation of Columbia River. Cost $5,400,000.

6. 99,000 kw. at Cabinet Gorge, in Washington near Idaho border; dam and powerhouse; cost $17,026,200.

7. 250,000 kw. at Z Canyon on Clark's Fork of the Columbia below the Canadian border; dam and powerhouse; cost $27,600,000.

8. 90,000 kw. at Five-Mile Rapids on Snake River near Pasco; dam and powerhouse; cost $21,258,000. Could be expanded to 210,000 kw. if the Nez Perce Dam is constructed.

9. 1,000,000 kw. by construction of dam and powerhouse at Nez Perce, on the Snake River in Oregon, south of Lewiston, Idaho. This also involves navigation control on the Columbia River up to the Pasco area. Cost $133,372,000.

10. 142,000 kw. at Hungry Horse on the Flathead River in Montana, $31,350,000.

In addition to the Grand Coulee and Bonneville extensions, other work planned is as follows:

1. Raise Ross Dam (Seattle City Light) approximately 250 ft., adding 79,000 kw. to City Light's output, estimated to cost between $7,000,000 and $11,000,000.

2. Add eight new generators to the Rock Island Dam of the Puget Sound Power & Light Co. near Wenatchee. The four now in operation generate 60,000 kw.; enlargement would add 160,000 kw., and cost $8,642,000.

3. Add 90,000 kw. capacity to the Nisqually River project of the Tacoma municipal system, already authorized by the city of Tacoma.

Commenting on the proposal affecting the Puget Sound Power & Light Co.'s dam, Raver said: "In view of the company's financial condition, the board recommended that the government take such steps with respect to taking over the company's facilities as will permit completion of this project."

Total cost of the Grand Coulee and Bonneville expansion is placed at $48,793,177.

The Bonneville Advisory Board urged that the Works Project Administration take immediate action to carry out the above phases of the program, but will wait 90 days before submitting recommendations concerning conconstruction of new dams and power plants which would provide almost four million additional kilowatts of power.

## Utah Power Leaders Will Pool Resources For War

Steps to assure all of Utah an uninterrupted supply of electric power by forming a state wide interconnected pool for the duration of the war were taken at a meeting of officials of both privately owned and municipal power utilities of the state recently. The session was called and presided over by George M. Gadsby, president of Utah Power & Light Co.

It was possibly the first time that power officials, representing both privately and municipally owned Utah plants had met. The program contemplates not only the interchange of power in case of damage to one system but a cooperative arrangement whereby equipment and even personnel can be quickly transferred to meet promptly any wartime emergency which might arise.

The state power pool will in turn be connected with Idaho, Montana, and the Pacific Northwest forming a huge regional pool of more than 2,695,000 kw.

## McLAUGHLIN SCORES MOVE TO ACQUIRE FACILITIES

Suggestion that the Bonneville Power Administration acquire the Rock Island plant of the Puget Sound Power & Light Co., on the Columbia River so as to expand its capacity immediately from 60,000 to 220,000 kw. brought a sharp reply from President Frank McLaughlin of the company.

"One naturally wonders why it is necessary to take over the company's facilities in order to effect the proposed development of Rock Island," McLaughlin said. "If necessary the government could put up the money essential for the proposed Rock Island development, just as it has done for many other industries, and the money could be paid back on much the same sort of a basis which the City of Seattle proposed in connection with the raising of the height of the Ross Dam—that is, to amortize the construction cost, or amount of money advanced, by crediting against the cost, the value of the additional kilowatt-hours sold.

"It doesn't appear that the government would have to take over the Puget Sound facilities . . . If such were the case, then the federal government would have to take over municipal power plants, airplane factories, shipyards and industrial plants to which the government has advanced or proposes to advance funds for expansion in connection with war production.

"The big issue before us these days is that we have a war to win. Naturally, we are for whatever power program is necessary to prosecute the war, preserve the things we are fighting for, and achieve victory at the earliest possible date."

## Federal Funds Denied City To Enlarge Power Plant

Application of Provo, Utah, for $1,828,000 in government funds to enlarge its municipal power plant was denied by Wright L. Felt, regional director of the Defense Public Works of Los Angeles on Feb. 12. The power application asked for a 50% grant and a 50% loan.

Felt said the application had been turned down after careful consideration but that there was a possibility the project might be suitable for inclusion in the long-range public works program which is being planned to absorb workers after the war.

# Birthplace of Battleships Guns and Tanks

## World's largest iron mine operated by Shell-Lubricated equipment

GREATEST SINGLE SOURCE of raw material for war production is the huge deposit of iron ore at Minnesota's Mesabi Range. More than 60,000,000 tons of ore were taken from this mammoth range in 1941, and this year's production will be even larger.

The fact that almost every shovel, tractor, truck and train on the Mesabi Range is lubricated or fueled by Shell offers unusual proof of Shell's ability to handle the toughest lubrication problems. Nevertheless, Shell oils and greases are constantly being improved to meet the ever more exacting demands of full-time production schedules. The Shell lubricants in use today are the result of constantly advancing technical research and development . . . are giving dependable service under conditions only a year ago considered impossible to solve.

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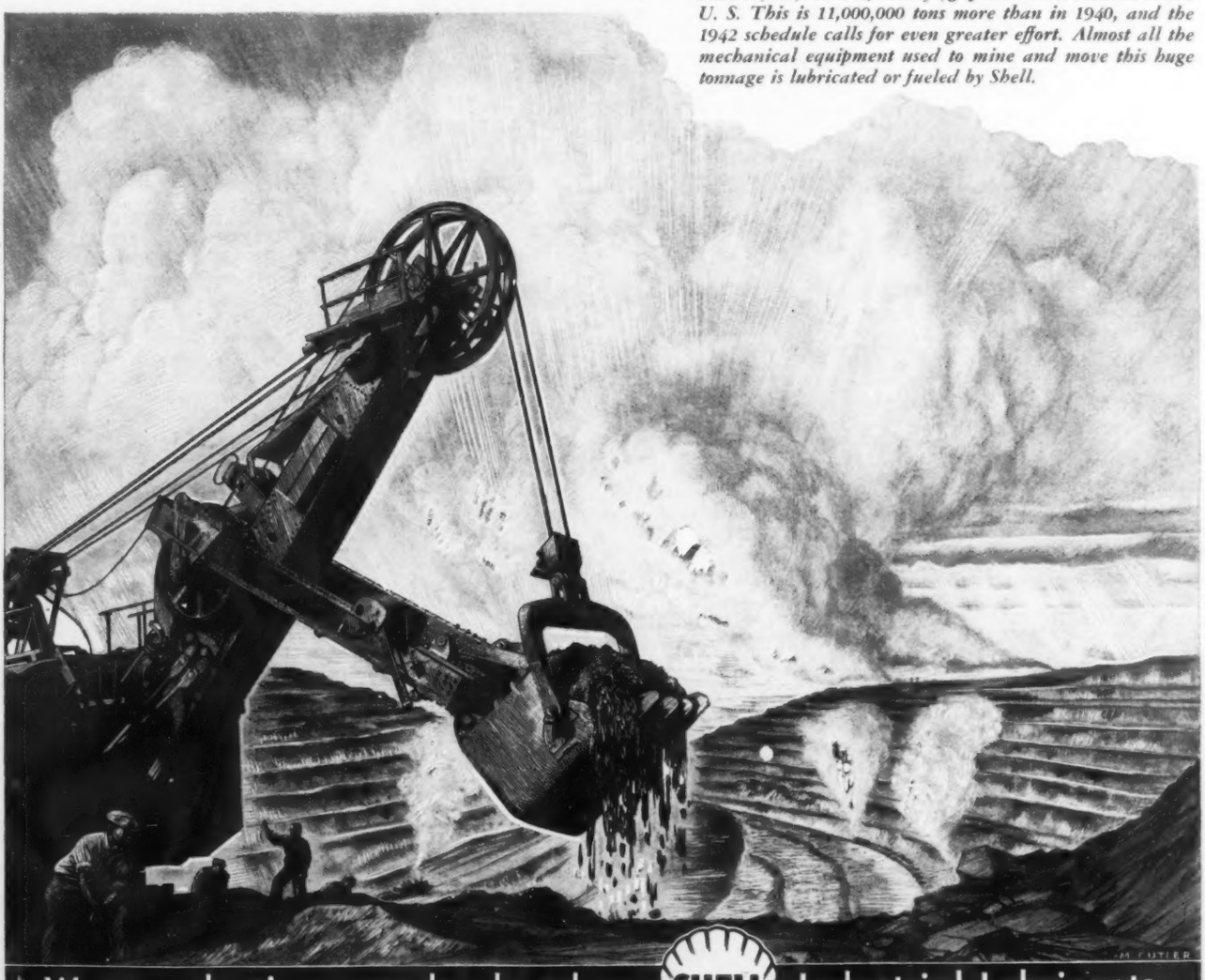
**1941 output of iron ore at Mesabi Range** *totalled more than 60,000,000 tons, nearly ⅔ of all iron ore mined in the U. S. This is 11,000,000 tons more than in 1940, and the 1942 schedule calls for even greater effort. Almost all the mechanical equipment used to mine and move this huge tonnage is lubricated or fueled by Shell.*



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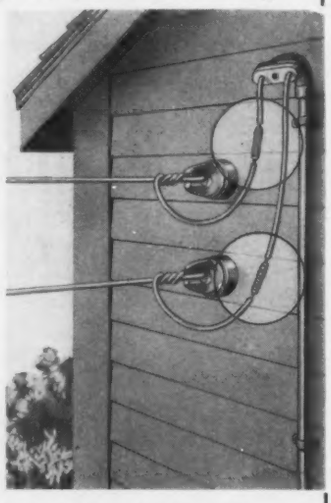

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## ICKES HAS NEW SCHEME TO ADVANCE PUBLIC POWER

Secretary Ickes renewed his bid for control of the power industry in the West last month when he submitted an elaborate report to Senator O'Mahoney of Wyoming listing 17 "sample" hydro and steam projects calling for 1,480,000 kw. of installed capacity at a cost of $350,603,000. The power program was part of an ambitious scheme for developing Western mineral and metal resources needed in the war program and incidentally provide the basis for more public power generation to compete with utilities "after the war."

The recommendations, the work of the secretary's newly formed War Resources Council headed by the department's former publicity chief, Michael Strauss, were made in response to O'Mahoney's request seeking to secure more war business for the Western states. Many of the power projects have been suggested before; some, such as the Antioch steam plant in California, have been turned down by Congress two or three times. The projects include the following:

Pilot Knob, Cal., part of the All-American canal, 33,000 kw.; Sacramento steam plant, 50,000 kw.; Newark, Cal., steam plant, (formerly called Antioch plant), 150,000 kw.; Scriver Creek, Ida., 120,000 kw. multi-purpose; Palisades, Snake River, Ida., 30,000 kw. multi-purpose; Kortes project, Wyo., 30,000 kw. multi-purpose; Heart Mountain, Shoshone River, Wyo., 10,000 kw. multi-purpose; Canyon Ferry, Missouri River, Mont., 35,000 kw. multi-purpose; Mystic, Cal.-Nev., storage project with 22,000 kw.; Dewey, Colorado River, Utah, 150,000 kw. multi-purpose; Lake Utah, Utah, 50,000 kw. steam; Fort Collins steam plant as part of the Colorado-Big Thompson development, 100,000 kw.; Bismark, N. N., 25,000 kw. steam; Mobridge, S. D., 25,000 kw. steam; Albuquerque, N. M., 25,000 kw. steam; El Paso, Tex., 25,000 kw. steam to integrate with the Rio Grande project; Bridge Canyon, Colorado River, Ariz., 600,000 kw. for integration with Boulder, Davis and Parker dams and the proposed Dewey dam.

● MONTANA-DAKOTA UTILITIES CO., Minneapolis, has been authorized by the Federal Power Commission to acquire certain electric facilities of the Mountain States Power Co. in Forsyth, Mont., now being served by power purchased from Montana-Dakota, and to issue $160,000 of unsecured Purchase Money Notes to consummate the transaction. Customers' accounts receivable and merchandise held for resale on the date of acquisition will be added to the notes as the purchase price. Included are distribution systems serving about 670 persons; a 33,000-volt transmission line extending 36 mi.; and an obsolete 420-kw. steam-electric generating plant.

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## PG AND E SEEKS LICENSE FOR POWER DEVELOPMENT

Pacific Gas and Electric Co. has applied to the Federal Power Commission for a license for its Pit No. 5 power development, a 160,000-kw. project now under construction in northern California. The application is based upon the recent FPC ruling that the project was subject to license under the terms of the Water Power Act.

At the same time the company petitioned the commission for a rehearing and abrogation of the findings that the project would require a federal license. Presumably this step was taken to preserve the company's legal rights. The application for the license offers to accept such a license as an amendment of or supplement to the company's Pit No. 3 development and stipulates that acceptance is conditioned upon the granting of terms and conditions similar to those governing this latter project.

## Southern California Edison Co. Proposes 75,000-Kw. Addition

Proposed plans for an $8,000,000 75,000-kw. addition to the Southern California Edison chain of Big Creek plants in the San Joaquin River watershed have been revealed in an application for an amendment to Edison's FPC license for Project 120, which covers the whole development.

The new plant, Big Creek No. 4, would contain three 25,000-kw. units. A two-mile tunnel would be involved. The station would be connected to the Edison transmission system over a 66-kv. line to Rector substation.

Preliminary hearings on the application for the amended license have been set to start in Washington on July 13.

## Utility Training Employees For Emergency First Aid

A plan to train nearly all employees of Utah Power & Light Co. in first aid, making them available for emergency work in their communities, was announced recently by Dr. Adam S. Bennion, assistant to the president of the company. Earl A. Hewitt, company safety and first aid director, is supervising the program.

Forty trained first aid instructors from centers ranging north to Ashton, Idaho, and south to Price, Utah, have received additional instruction at the company's Salt Lake division auditorium and will organize classes in their communities. The training will be extended to the public.


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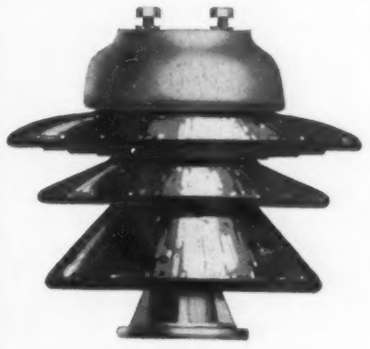

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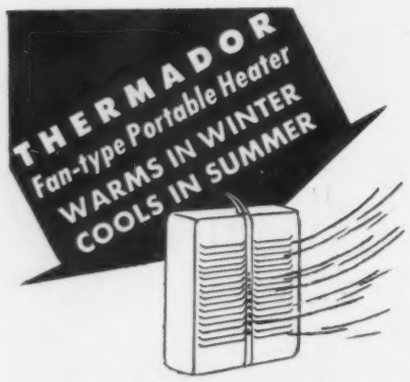


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## PUGET SOUND TAKES PUD CASE TO SUPREME COURT

A petition for a review by the United States Supreme Court of the $5,000,000 Whatcom County PUD case has been filed in Washington, D.C. by Puget Sound Power & Light Co.

The case is of fundamental importance and the appeal to the highest court in the nation is expected to decide the paramount issue: whether a public utility district has the right to dismember a company's integrated system piecemeal by condemnation proceedings. Much of the future growth of PUDs in the Northwest may be involved in the outcome.

First of many cases brought to trial against the company and the first in the state involving piecemeal condemnation of an integrated utility system, the Whatcom County case has been pending since April, 1939, with the company still in possession of its properties.

Following a trial lasting more than three months before Federal District Judge John C. Bowen at Bellingham, a verdict was returned Aug. 7, 1940, awarding the company $5,000,000 for its Whatcom County properties. The award included severance damage to the remainder of the company's system. The case was later carried to the Ninth Circuit Appeal Court at San Francisco, where a two-to-one decision affirmed the lower court's judgment. Judge Albert L. Stephens held for a reversal.

Any decision that the Supreme Court makes is expected to have a decisive bearing on other condemnation suits being waged throughout the state against the company.

In a statement regarding the company's application to the Supreme Court for a review of the case, President Frank McLaughlin said, in part:

"We feel that this appeal is necessary in the interests of all concerned and our national welfare. Even in ordinary times, the uneconomic and costly piecemeal condemnation program is decidedly not of public benefit and now, in wartime, it is even more clear to us that to tear apart this unified and interconnected system serving many vital government posts and defense industries distributed over a wide area is not the right or sound thing to do.

"The government is spending a great deal of money interconnecting public power systems. It therefore seems inconsistent to break up into numerous county-wide pieces a large interconnecting system such as Puget Sound. We very definitely feel that the company's system should be preserved intact. So doing is certainly in the best interests of national defense and we have dedicated our all-out effort to the winning of the war."

## Arizona Company Schedules 1942 Property Additions

Central Arizona Light & Power Co. will spend approximately $302,400 for additions to its electric property in 1942, according to L. K. Doutrick, vice-president and chief engineer. This is about $2,400 more than was spent in 1941.

Major expenditure will be for substation additions, with $141,500 set aside in the budget for 12-kv. and 66-kv. additions. Distribution lines and services call for an expenditure of $50,000, and distribution transformers for $15,000.

A total of $33,400 has been earmarked for new 66-kv. transmission line. Electric metering is expected to cost $15,000 in 1942.

Distribution lines and services cost $80,000 in 1941 and $30,000 was spent for 12-kv. and 66-kv. substation additions. Other major expenditures last year included: steam plant control room extension, $23,500; acquisition of lines, $26,700; distribution transformers, $24,600; electric metering, $29,300.

● EFFORTS TO EXTEND PUBLIC OWNERSHIP of power distribution systems should be adjourned for the war is the belief of six out of ten Portlanders interviewed in "The Front Door Ballot Box" poll printed in the *Oregonian*. The question was asked: "Do you or do you not believe that efforts to extend public ownership of power distribution systems should be adjourned for the war?" Of those interviewed, only one economic group, those on relief, supported a continued public ownership program More men than women were public power advocates.

● THE TACOMA, WASH., CITY COUNCIL has approved appropriation of $25,000 from City Light funds for installation of oil-burning equipment in the steam-powered electric plant No. 2 on the tideflats. Commissioner R. D. O'Neill approved the plan, which will give the plant both oil and coal burning equipment to help meet possible emergencies.

● DR. PAUL J. RAVER, Bonneville administrator, announces that he has executed a contract to deliver electrical energy to naval establishments in the Puget Sound area for $17.50 per kilowatt year.

# Sometimes Peas in a Pod are NOT ALIKE

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**The L-M ROUND-WOUND gives you more desirable features than any other transformer. Higher short-time overload capacity, uniformly higher impulse strength and high mechanical resistance to short circuits are inherent advantages of this transformer.**

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**Uniformly higher impulse strength is a result of the round shape of the coils. In winding, all sharp bends and strains in the wire are eliminated. Also eliminated, is the tapping mallet, which so often causes damage to the wire and insulation in conventional coil winding.**

**The L-M ROUND-WOUND is mechanically stronger to better withstand short circuit conditions without damage. Short circuits tend to form coils into a round shape. By having round coils to start with, the ROUND-WOUND is not subjected to the strains which short circuit conditions impose.**

**Regardless of the tank you put it in, the L-M ROUND-WOUND will still give you more desirable features than any other distribution transformer. ROUND-WOUND is available in 1½ to 25 Kva, 2400 to 7620 volt ratings.**

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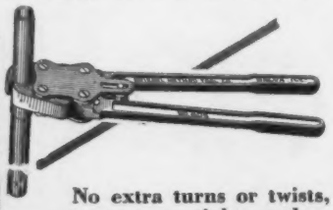

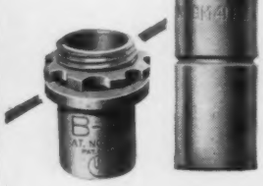

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Answer to "Who Am I?"

(See Page 50)

Henry H. Buell

### Electriquiz Answers

1. False. Fuel is a combustible material. Electricity is the refined energy remaining after ashes, fumes, soot, etc., have been removed; or water has fallen from one level to another.
2. True. Electric flash bulbs, only a few years old, have "made" modern news photography. High speed flash (1/50,000ths of a second) has opened new fields in scientific and sports photography.
3. True.
4. False. The percentage is not limited to 75% but is nearer to 95%.
5. True. Deep-well turbine pumps were built first in Los Angeles for farm irrigation. Southern California still leads in their manufacture.
6. True.
7. False. There should be no difference in power.
8. True. Hydro-electric three-phase power generation for long distance transmission was begun in 1893 in the Mill Creek No. 1 plant of the Redlands Electric Light & Power Co., one of the predecessors of the Southern California Edison Co.

● THE CITY OF ANCHORAGE, Alaska, plans the purchase of the power and light system of Anchorage Light & Power Co., Inc., for $1,250,000 for which bonds will be issued.

## BONNEVILLE TO ENLARGE LONGVIEW SUBSTATION

Allocation of $4,261,000 has been approved for construction of 230,000-volt facilities at Bonneville's Longview, Wash., substation, which will be developed as a major point in the Bonneville-Grand Coulee transmission network. A previous allocation of $1,436,300 covers costs of 115,000-volt installations.

An additional $556,000 has been allocated for construction of transmission lines to the substation. A 230,000-volt steel tower loop will be strung to Longview from a connection at Kelso, Wash., with the Vancouver-Chehalis 230,000-volt line No. 1. A 115,000-volt double circuit line also will be constructed to the substation from a tap on the St. Johns-Astoria line near Rainier, Ore.

## University Enrolls 6000 In Defense Training School

More than 175 courses in engineering, science and management are being offered by the University of California this term to men and women in industry through its defense training school. Approximately 6,000 attended the fall sessions.

Sponsored by the U. S. Office of Education and administered by the university, the courses are designed primarily for persons employed in defense industry or preparing for such work. High school education or equivalent is the minimum requirement and there is no tuition fee.

The program is under the supervision of a faculty committee, with Prof. Morrough P. O'Brien as chairman and Prof. Charles F. Dalziel in charge of the general engineering courses. Top men from the defense industry field supplement the university faculty.

● THREE ADDITIONAL 108,000-kw. generators for Grand Coulee dam have been ordered by Interior Secretary Harold L. Ickes from Westinghouse Electric & Mfg. Co. The generators, which will cost $2,792,330, will be installed in 1944 or 1945 and will complete the west power plant at Grand Coulee.

● ROCKY MOUNTAIN ELECTRICAL LEAGUE dedicated its new headquarters in the Gas & Electric Building at Denver on Feb. 12. The entire industry was invited to inspect the new quarters and furnishings. A light luncheon was served by the Women's Division in the conference room.

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*America's Greatest Scarcity*

Scarcer than any industrial raw material or unit of equipment is the *time* required to put more power into our war machine.

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The services of the GRAYBAR Power Apparatus Specialist . . . like that of GRAYBAR Specialists in lighting . . . signaling . . . and other fields . . . are among the "extras" you get as a customer of GRAYBAR, augmenting the services of experienced local representatives.

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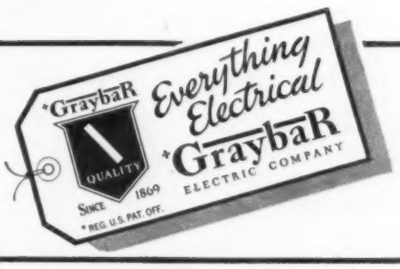

## SEATTLE ASKED TO RAISE HEIGHT OF POWER DAM

To provide for immediate enlargement of the production capacity of Seattle City Light's Skagit project as a defense power measure, federal authorities have communicated with Mayor Earl Milliken urging that the height of the Ross (Ruby) Dam be increased to provide electrical energy which, it is stated, will be critically needed by the winter of 1943.

J. A. Krug, Coordinator, power section, WPB, made the proposal in a recent letter to Milliken, who immediately took the situation up with City Light Superintendent E. R. Hoffman, and the entire matter was laid before the city council.

The proposal calls for immediate undertaking of the projected second step in the dam's construction to an elevation 1,500 ft. above sea level (the city's eventual plans provide for raising the dam to 1,725 ft.) at a cost of approximately $5,000,000. The dam now rises to 1,365 ft. above sea level. It is 290 ft. high from bedrock; would be raised to 485 ft. by the second step.

Immediate opposition to the program, if city financed, came from Bob Jones, chairman of the utility committee, and from Council President David Levine, who contended that the city should not be burdened with a bond redemption after the emergency is over.

Hoffman and Milliken favored the project, forecasting financial assistance which would enable City Light to carry out long-planned development of the dam. In a letter to Krug, Milliken proposed that, as a basis for discussion, the government advance the cost of heightening the dam and that energy used in war production be applied as payments on the financing until such time as City's Light's own earnings would warrant taking over the remaining obligation.

The Mayor revealed that both Krug and Dr. Paul J. Raver, Bonneville administrator, had discussed the power situation in Seattle and the Pacific Northwest with him during a recent Washington visit.

## Early Ruling Expected In PG and E Valuation Case

Early conclusion of the valuation proceedings being conducted by the California State Railroad Commission at the request of the Sacramento Municipal Utility district is presaged by the appearance of witnesses who are summing up the testimony presented by both the district and the Pacific Gas and Electric Co.

Last month W. G. Vincent, PG and E vice-president and executive engineer, testified that the electrical distributing system within the district would be worth $18,275,000 if acquired by the district. This figure includes business and physical severance damages over and above the $12,500,000 value of the property for its physical and going concern worth. Similar testimony was to be presented by district witnesses at hearings scheduled for March 4. This will leave only rebuttal testimony to be heard before the commission begins its final deliberations.

Kathryn Baird, assistant clerk USBR, gets Electrician Arthur Townsend's pledge to buy defense stamps and bonds each pay day. They are shown in front of one of the main control panels at the Grand Coulee power house.

● L. T. MERWIN, president of Northwestern Electric Co., Portland, told stockholders in a recent letter that the company's revenues and expenses "will doubtless be affected by the war to an extent not yet determinable." Energy sales were affected immediately both by actual blackouts and by the adjustments in display lighting necessary to maintain communities in readiness to blackout on short notice, he reported. "We can also look for the vastly increased needs for war materials of all kinds to require some diversion of electricity from normal civilian uses to urgent military production, with resultant shifts in revenue." The necessity of guarding power plants and other key establishments will add to operating expenses and taxes will certainly keep on increasing, he pointed out. "In every way, the situation will demand the utmost in alertness, skill and efficiency on the part of the company's entire organization," he asserted.

## RURAL ELECTRIFICATION MEN DISCUSS PROBLEMS

"There are many things the rural electric service men of the utilities can do for the farmer in war time despite restrictions on extension of service," George W. Kable, editor of *Electricity on the Farm*, told the Tri-State Rural Electrification Conference in Yakima, Wash., Jan. 30-31. "The government has asked for greater food production, and electricity can contribute to this in a number of ways," said Kable. "There seems to be no call for our companies to discontinue their rural service departments."

The conference, which is generally held every two or three years, was sponsored this year by Washington State College, with Pacific Power & Light Co. acting as host. Representatives were present from all the larger utility companies of the states of Washington, Idaho and Oregon, as well from the research staff of the agricultural institutions of those states. D. B. Leonard, sales manager of Pacific Power & Light Co., opened the conference, and C. O. Bunnell, farm service supervisor of that company, had charge of arrangements.

Leonard pointed out that while the saturation of automobiles on farms in the three states had increased in the 1930 decade only a few percentage points, now reaching from 75 to 78%, the percentage of electrified farms had nearly doubled in the same period with electrification in 1940 of 61.5% in Oregon, 62% in Idaho, and 73.6% in Washington. Leonard indicated the opportunity before the rural service men for rendering service during the war.

Berkeley Snow, secretary, Northwest Electric Light & Power Assn., gave added emphasis to the point in his talk entitled, *You're in the Army Now*. "Never has civilian effort been mobilized in a war as it will be in this one," said Snow. "Truly the man behind the plow has a tremendous contribution to make to the winning of the war, and here electricity can be made to help him, either in adding to his production per acre, or in relieving him of the necessity for using man-power, already becoming scarce on farms."

Talks that followed during the two-day session brought out activities of company rural electrification departments and new developments in research on electricity in agriculture being carried on at Washington State College, University of Idaho and Oregon State College.

● LEWIS COUNTY PUD, Chehalis, Wash., has purchased the Quick Building, costing approximately $25,000 to be used as future headquarters.

# SHIPS WILL WIN THE WAR

Ships for every ocean . . . ships for every need . . . battleships, cruisers, carriers, submarines; ships for troop transport and supply . . . ships will win this war.

For with ships and ships only, can the ever increasing stream of men, machines and munitions be delivered to defeat the enemy wherever he may be found.

To build these ships in time, all of us must help . . . not only the worker in the shipyard . . . but the molder in the mill . . . the tool maker in the factory . . . the railroad man and miner . . . the electrician and power engineer . . . and the rest of us by buying Defense Bonds. These are mighty hammer blows for Victory.

**THE OKONITE COMPANY**
Insulated Wires and Cables, Passaic, N. J.

★ **Here at our 3 factories men and machines work night and day to build the insulated wires and cables that provide safe, sure electrical power and control for the ships that will win the war.**

# KEEP THEM RUNNING

**DEPENDABLE POWER IS ESSENTIAL IN THE PRESENT EMERGENCY**

● Assure yourself of dependable brush performance on your electrical equipment by enlisting the aid of your National Carbon sales representative. He is capable of giving you valuable assistance in the selection and application of brushes on your generators and motors.

As further assurance of maximum reliability and economy of operation, the services of our engineering staff, experienced in the solution of difficult operating problems, are yours at no added cost when you specify . . . .

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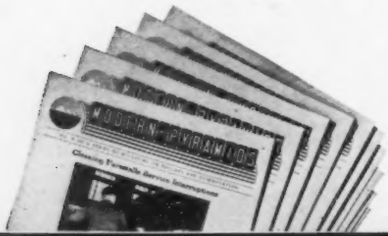


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## *Conserve Copper*

● Copper is of prime importance in the national war effort. You can help conserve this essential metal by detaching and saving shunts and connections from worn-out brushes. The copper you save in this way can be reused for other important purposes in your own plant or can be turned over to local salvage agencies to be returned to the nation's supply and thus find its way back into some war task.

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## CITY STILL SEEKING WAY OUT OF POWER DILEMMA

San Francisco officials are exploring three possible courses to extricate the city from its Hetch Hetchy power dilemma. One group left for Washington late in February to confer with Secretary Ickes on possible sale of the power to a war industrial plant to be located near Newark, where present city-owned transmission lines terminate. The board of supervisors had under consideration a resolution requesting the secretary to petition the federal courts for a stay of execution of the injunction prohibiting further sale of power beyond June 30, 1942, to Pacific Gas and Electric Co. Representatives in Congress were still investigating possibilities for amending the Raker Act.

Since the House Public Lands Committee last month struck out from the proposed Raker Act amendment all but the enacting clause, word has been received that this does not necessarily close the door to final amendment. The action was taken to force the city to investigate other possibilities according to report. In the meantime, Secretary Ickes advised San Francisco's Mayor Rossi to sell the power to some wartime industry pending further efforts to effect municipal distribution.

Sale to an electro-metallurgical industry has several drawbacks. At present the city receives $2,400,000 net from the sales of power. Average rate is about 4.6 mills per kwh. The 88,000-kw. output is not firm power. An industrial plant would require standby because of the single transmission line. Few such industries would pay the rate that the city now receives, in the opinion of experts.

## California Firm Will Use Westinghouse Processes

Under a recent agreement, the Joshua Hendy Iron Works, Sunnyvale, Calif. is authorized by Westinghouse Electric & Mfg. Co. to use its plans and processes to produce marine turbines, gears and auxiliary apparatus.

Joshua Hendy will be the first West Coast firm to manufacture turbine geared propulsion equipment. The plant was established in 1856 as a metal fabricating concern. It is now at work on reciprocating steam engines for Liberty type cargo ships being built on the coast.

Hendy engineers will be provided with manufacturing data, drawings and records assembled by Westinghouse during its 45 years of turbine production. The first geared turbine unit for the Navy was installed by Westinghouse in 1911.

Big marine gears are cut in air-conditioned rooms so that outside temperature changes will not affect the finish. Gears are machined within a tolerance of one one-thousandth of an inch, one-half the thickness of ordinary paper.

● The Washington PUD Commissioners' Assn. at its annual convention held in Yakima on Jan. 19, elected Harry Pierson, Ephrata, president, and G. A. Peters, Chehalis, vice-president. M. M. Moore, Ilwaco, was named secretary and Charles Pederson, Bellingham, treasurer. The association voted for an initiative to facilitate the system-wide purchase of private utilities by PUDs rather than the "piecemeal" purchase. A resolution urged PUDs to cooperate in building a "backlog" of post-war projects to take care of the unemployment problem.

● The Spokane Pot & Kettle Club was inaugurated on Feb. 14, with Fred Stokes, Jensen-Byrd Co. in charge of reservations. J. P. Cummings led a party of 30 Seattlites to the Spokane Hotel for the event.

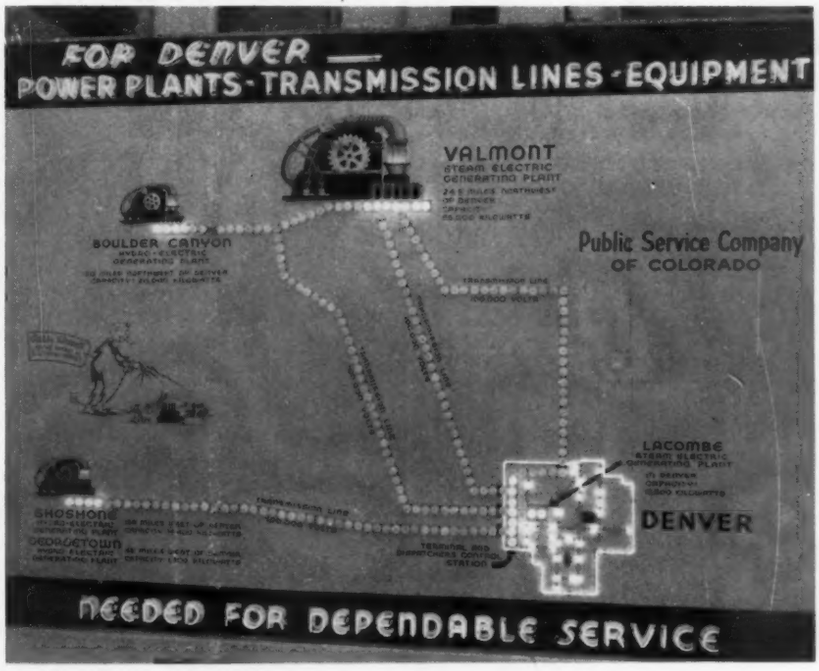
## COMMISSION REPORTS ON UTILITY NET RETURNS

Net return of California's privately-owned electric utilities for the fiscal year ending June 30, 1941, was 6.63% of the undepreciated rate base, according to the annual report of the California State Railroad Commission. This compares with a figure of 6.78% for the preceding year.

Electric companies carried the highest tax burden of any utilities, the report discloses, the levy amounting to $19.64 per $100 of operating revenue. The average for all classes of utilities $17.21 per $100 of gross, as compared with $15.24 for the preceding year.

Electric rate reductions for the 12 months covered by the report totaled $3,946,728.

● Seattle City Light has prepared for a possible evacuation of employees and the public in the event of an air raid, it has been announced. Stairways have been assigned to various groups and two stretcher squads will be stationed in the building. Guards will be equipped to handle incendiary bombs and will be on the alert for sabotage or looting.




This mobile diagram prepared by Public Service Co. of Colorado and showing the four-way protection afforded Denver's electric service has attracted public interest due to concern over power resources. Illuminated and animated the 12 by 15-ft. sign shows by flasher control flow of energy from the various generating plants to the city of Denver; interconnection of electrical supplies at the terminal; wheels in motion at company's principal generating stations. Stands on company sales floor when not on exhibition at public events

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## NORTHWEST ENGINEERS, OPERATING MEN TO MEET

With their annual meeting shortened from the customary three days to two days and with a program stream-lined to bring in round table discussions of operating problems created by the war, the Engineering & Operation Section of the Northwest Electric Light & Power Association will hold its 19th annual meeting at Seattle, Wash., April 23-24, according to announcement by M. T. Crawford, Puget Sound Power & Light Co., Section chairman. Headquarters will be at the Olympic Hotel.

The Accident Prevention, Utilization, Power Production and Electrical Equipment Committees will present their programs Thursday, April 23. Friday morning, the 24th, will be devoted to the remainder of the Electrical Equipment program and Transmission & Distribution Committee, while on Friday afternoon all committees will hold a symposium on operation under war conditions. The usual dinner is scheduled for Friday night under the direction of J. Hellenthal, Puget Sound Power & Light Co., who is chairman of arrangements.

Saturday will be given over to inspection trips to points of interest in and around Seattle.

As many as possible of the formal papers will be distributed in advance, and presented at the meeting by title only, allowing most of the meeting time for general discussion. Many of the new problems brought about by the war will be explored.

● IN A DEAL financed by the REA at just under 2½ percent interest, the Grant County PUD has acquired the Soap Lake Utilities Co. at Soap Lake, Wash., R. H. Hendricks, director of the Public Utilities District Information Service, reports. The sale price was $24,500; revenues of the company, Hendricks states, have been in excess of $15,000 annually. On January 16, the Grant County PUD purchased the Grant County Power Co. properties at Coulee City. This is the fourteenth acquirement in the state of private properties by PUD's, Hendricks reports. Grant County headquarters are at Ephrata, Wash.

● CALIFORNIA ELECTRIC POWER CO., Riverside, has been authorized by the Federal Power Commission to issue a note in the amount of $1,350,000 to the Bank of America National Trust and Savings Association to refund outstanding short term notes held by Denver banks. The new note will bear interest at the rate of 3%. Proceeds of the short term notes were used principally to meet settlement of federal income taxes and interest for 1934 and 1935.

# A WAR MESSAGE
## *to*
# ALL EMPLOYERS

## ★ From the United States Treasury Department ★

WINNING THIS WAR is going to take the mightiest effort America has ever made—in men, in materials, and in money! Every dollar, every dime that is not urgently needed for the civilian necessities of food, clothing, and shelter, must, if we are to secure final Victory, be put into the war effort.

An important part of the billions required to produce the planes, tanks, ships, and guns our Army and Navy need must come from the sale of Defense Bonds. Only by regular, week by week, pay-day by pay-day investment of the American people can this be done.

This is the American way to win. This is the way to preserve our democratic way of life.

Facing these facts, your Government needs, urgently, your cooperation with your employees in *immediately* enrolling them in a

### PAY-ROLL SAVINGS PLAN

The Pay-Roll Savings Plan is simple and efficient. It provides, simply, for regular purchases by your employees of United States Defense Bonds through systematic—yet voluntary—pay-roll allotments. All you do is hold the total funds collected from these pay-roll allotments in a separate account and deliver a Defense Bond to the employee each time his allotments accumulate to an amount sufficient to purchase a Bond.

The Pay-Roll Savings Plan has the approval of the American Federation of Labor, the Congress for Industrial Organization, and the Railroad Brotherhoods. It is now in effect in several thousand companies varying in number of employees from 3 to over 10,000.

In sending the coupon below, you are under no obligation, other than your own interest in the future of your country, to install the Plan after you have given it your consideration. You will receive—1, a booklet describing how the Plan works; 2, samples of free literature furnished to companies installing the Plan; 3, a sample employee Pay-Roll Savings authorization card; and 4, the name of your State Defense Bond administrator who can supply experienced aid in setting up the Plan.

**To get full facts, send the coupon below —today! Or write, Treasury Department, Section B, 709 Twelfth St., NW., Washington, D. C.**

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1. It provides immediate cash now to produce the finest, deadliest fighting equipment an Army and Navy ever needed to win.
2. It gives every American wage earner the opportunity for financial participation in National Defense.
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4. It reduces the percentage of Defense financing that must be placed with banks, thus putting our emergency financing on a sounder basis.
5. It builds a reserve buying power for the post-war purchase of civilian goods to keep our factories running after the war.
6. It helps your employees provide for their future.

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# TRADE

## notes

● ELECTRICAL SANITATION SALES CO. is the new distributor for Westinghouse Sterilamps in Southern California and Arizona. The agency, which is bounded on the north by Bakersfield, is equipped to answer technical questions on the proper installation of Sterilamps. Headquarters are in Los Angeles. W. C. McHenry, of the sales company, reports that there are no priorities on Sterilamps, which are important in food preservation.

● RAWLPLUG CO. announces its Pacific Coast lineup for stock, technical service and information regarding its expansion bolts and devices. In San Francisco it is Rawlplug Sales Co., 1135 Mission St., with J. A. Kinkead, manager; Los Angeles, Rawlplug Los Angeles Co., 2115 South San Pedro St., Kenneth M. Anderson, manager; Seattle, Rawlplug Seattle Co., Lowman Bldg., J. H. Sutthoff, manager.

● HOCKENSMITH SALES in Los Angeles has taken on the Connecticut Hard Rubber Co. line of insulated tools.

● HOWELL ELECTRIC CO. and Moltzen & Fitch Electric Co. of Reno, for many years associated together, the former as an appliance store, the latter as wiring contractors, are now separated. Howell Electric Co. moved to 120 Sierra St., where an appliance showroom is located. Moltzen & Fitch remained at 275 South Virginia St. No appliances are carried. Fixtures and wiring constitute this firm's business.

● COLUMBIA ELECTRIC & MFG. CO., Spokane, has been awarded a type A contract by the Navy Department, calling for the manufacture of various types of telephone connections, electrical fittings and lighting equipment. The firm will operate on a seven-day week, three shifts a day, according to Eric A. Johnston, president.

● W. D. HOWZE SALES CO., Los Angeles, has been dissolved. "Bill" Howze is now president of his own company, known as W. D. Howze & Co. The new company is located at 912 E. Third St., Room 305.

● GROFF'S ELECTRIC CO., Los Altos, Calif., has build a new store and home. The home contains a full Hotpoint electric kitchen which will be used by Mrs. Groff to demonstrate its advantages to customers.

● FRIGIDAIRE has moved its Pacific Division offices from the Western Furniture Mart, San Francisco, to offices with the Oakland division at 1250 53rd St., Oakland. R. G. Huchinson, manager, and others of the staff including C. F. Mitchell, W. H. Baldwin and Fred W. Beecher, are involved in the move.

● GEORGE HAMBURGER CO., Denver, will represent Corning Glass works in New Mexico as well as in Colorado and parts of Wyoming and Nebraska, according to an announcement by C. J. Phillips, sales manager of the insulation division. W. D. Howze & Co., Los Angeles, will extend its southern California and Nevada territory to include Arizona.

● ANOTHER NEW DEMONSTRATION and display unit has been put on the road by the A. B. Chance Co. Its purpose is to help men in the field get better acquainted with the methods and economy of live line maintenance. Unit Number 5 carries enough hot line tools to handle a wide variety of maintenance jobs on voltages ranging from 6900 to 220 kv. Also, for display purposes, it carries a complete line of hot tap clamps, samples of grounding equipment, samples of Chance guying fixtures, anchors, anchor rods, and construction tools. This unit is under the supervision of Gene Thatcher, electrical engineer and hot line tool expert. Through his guidance line crews quickly acquire the technique of doing hot line maintenance work, and gain confidence in the safety and practicability of hot line tools.

**M. F. Beisber has been named Pacific coast sales engineer by Line Material Co., transformer division. He will have headquarters at Oakland, California**

# PRIORITIES

**In response to many requests, ELECTRICAL WEST will publish in this column monthly a summary of significant priority rulings and a bibliography of pertinent articles on the subject.**

## Form PD-200

Applications for priority rating on new utility construction are to be made in the future on Form PD-200. It is still advisable in filling out this form to supplement the application with data previously called for by the Power Branch of WPB.

Form PD-200 is the standard project application for all industries. Up until now the Power Branch used a form of its own for project ratings. This new move was made in anticipation of a shift in priority procedure in which project ratings will only be awarded for specified amounts and types of materials listed as necessary for the job on the PD-200 form.

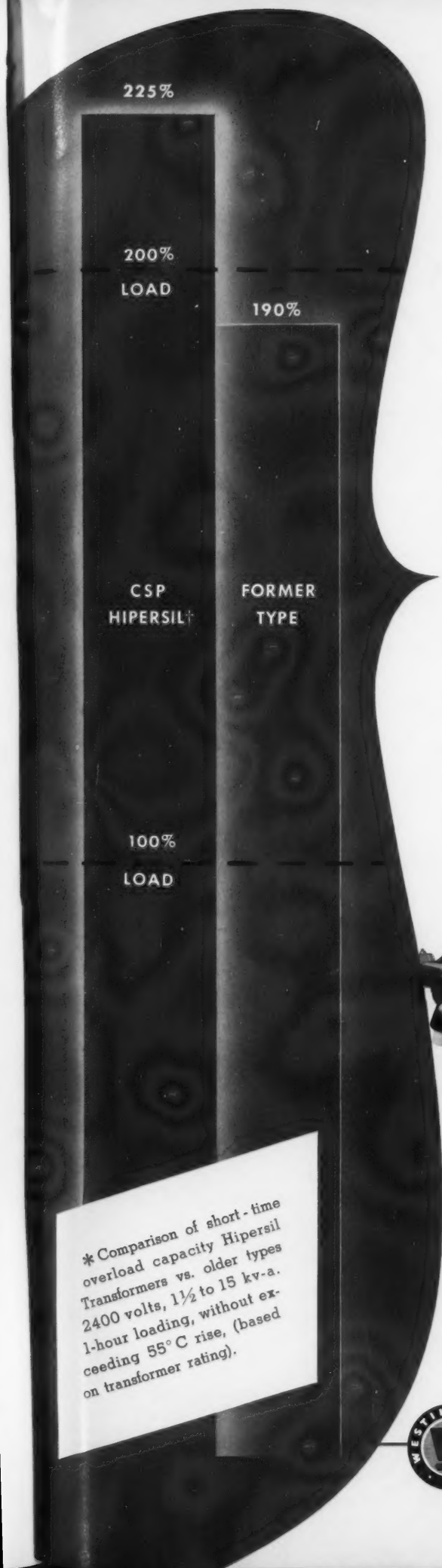
Project ratings are still to be sought for all new utility construction involving expenditure of more than $2,500 for materials, or more than 10 suppliers. Construction involving less than $2,500, but in excess of the $500 limit under P-46, still is given priorities through use of form PD-1A, use of which became mandatory after March 1.

● SMALL MANUFACTURERS whose annual volume of business is less than $100,000 can use a simplified production requirements plan in obtaining priority assistance for scarce materials over a calendar quarter. A new one-page blank known as PD-25X is to be filled out. It will be referred to a new Small Business Section in the Production Requirements Branch of WPB.

● MARCH 2* was the critical date for use of Preference Rating application forms PD-1A and PD-3A. After that date all individual preference ratings must be assigned on those forms—3A for Army and Navy and certain other government agencies and 1A for all other uses eligible under the "P" series.

● FORMAL PRICE CEILINGS on wire, cable and cable accessories have been established by OPAC. With the exception of products containing lead and of weatherproof wire and cable, maximum prices established are those in effect Oct. 15, 1941. Lead cable and weatherproof prices are adjusted to provide for the increased price of lead and a competitive situation in the case of cotton yarn.

* Postponed to March 15.

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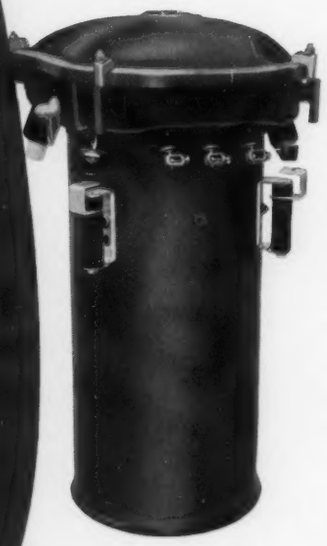

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For complete information call your Westinghouse Office or write for Booklet 2287 on Hipersil in CSP Transformers, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

J-70355

* Comparison of short-time overload capacity Hipersil Transformers vs. older types 2400 volts, 1½ to 15 kv-a. 1-hour loading, without exceeding 55° C rise, (based on transformer rating).

†Registered trade-mark of Westinghouse Electric & Manufacturing Co. 1934.

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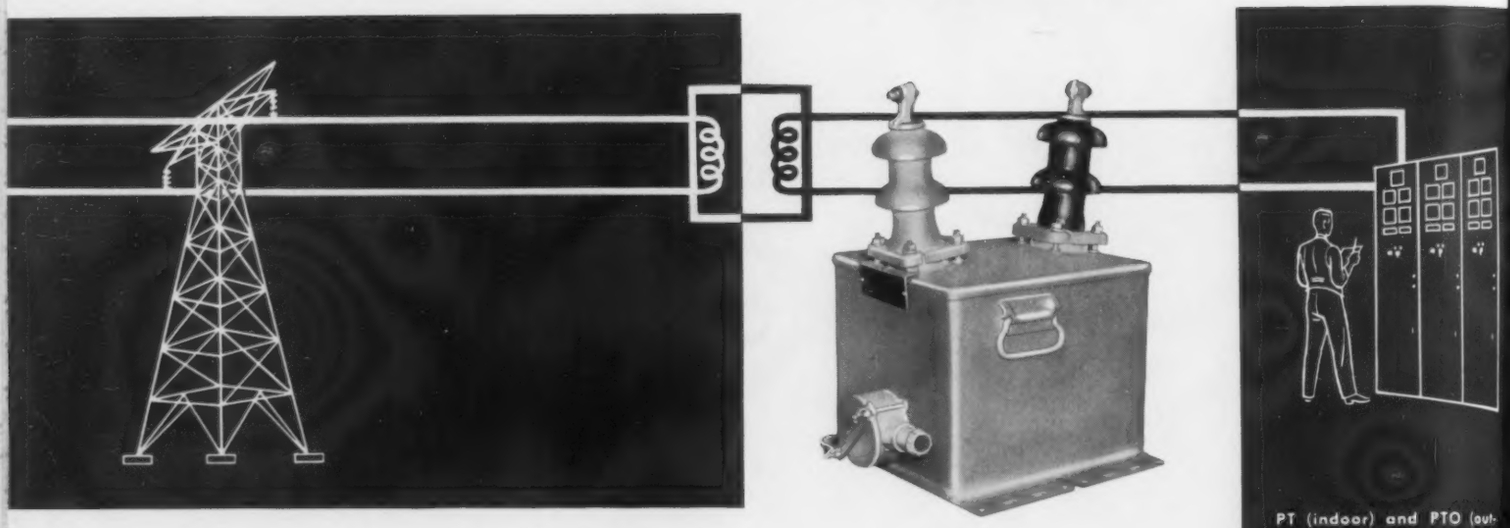
# meter and relay accuracy

# starts



PT (indoor) and PTO (outdoor) Potential Transformers cover the range from 240 120 voltage ratio to 14,400 120. Surge levels range from 30 kv to 95 kv.

# with the instrument transformer

Accuracy in meters and relays depends on the "report" of power line conditions which they receive from instrument transformers. Co-ordinated teamwork is the key.

As manufacturers of metering and relaying equipment for every type of application, we recognize the full importance of co-ordinated accuracy in instrument transformers—and our wide experience has shown us how to meet this requirement under all conditions.

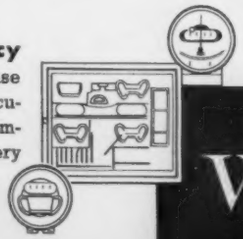
Our PT and PTO Potential Transformers are a good example. Their inherent Long Time Accuracy is supported and protected by special exclusive features that give them high impulse strength, greater safety, and lower maintenance cost.

Plastic impregnation under vacuum is one reason for this Long Time Accuracy. It completely protects coils against moisture and external disturbances and gives a dielectric strength of from two to three times that of oil. The expense of maintaining and checking oil is eliminated.

Long Time Accuracy is a characteristic of all Westinghouse Instrument Transformers regardless of application. J-70356

**partners in long time accuracy**

The Long Time Accuracy of Westinghouse Meters coupled with the co-ordinated accuracy of Westinghouse Instrument Transformers provides the ideal combination for every metering application—single-phase or polyphase, watthour or demand, kw or kv-a indicating or recording.



Westinghouse

# PEOPLE
*made this news*

## Sickler Priorities Chief For Power Branch

Barclay J. Sickler, chief of the Bonneville Power Administration rates and statistics section, has been appointed chief of the priorities section of the Power Branch by J. A. Krug.

Sickler was a part time consultant for the Power Branch last year. He is being loaned by Bonneville for full time service in his new capacity. Prior to his connection with Bonneville, Sickler, a graduate of the University of Washington and Northwestern University, has been connected with the United Public Service Co. of Chicago and the Wisconsin Public Service Commission.

The priorities post has been technically vacant since the departure of E. W. Morehouse, who took it on a one-month basis last fall. Walker Cisler has been acting chief, in addition to his other duties which include turbine allocations, and so forth. It is understood that the various priorities specialists now handling different phases of utility priorities will continue their present assignments.

● TRENT GERMAN, Southern California Edison Co. lighting engineer, Long Beach, was one of the ten "Sourdoughs" named throughout the United States by the General Electric Co. as the climax of its Forty-Niner lighting activity. All entries on which Forty-Niner pins were awarded were entered in the final competition for the "Sourdough" awards. Each of the ten winners received a gold wrist watch as a prize.

● PAUL H. YELTON has been appointed permanent superintendent of California Electric Power Co.'s San Bernardino district. An employee dinner at the California hotel marked the appointment and Yelton's completion of 20 years of service in the organization.

● SAM H. HAZLETON, JR., division engineer for the Pacific Division, General Electric Lamp Dept. at Oakland, has returned after service in the United States Army as a First Lieutenant in the Supply Office of the 53rd Signal Battalion. Hazleton was a Reserve Army officer and called to duty last March. First located at Camp Lewis, Wash., he was sent to Camp Bowie, Texas, where ragweed caused asthma to such an extent that the Army retired him to the inactive list, subject only to call in California. Reuben E. Lagerstrom, who was serving as division engineer in his place, will return to the midland division at Chicago late in March.

● FRED J. HUME hung up a new record recently in his city, when he was elected mayor for his ninth successive term. Hume is head of the electrical contracting firm of Hume & Rumble, operating in New Westminster, Vancouver, Edmonton, and at other cities. A few years ago he was invited to run for election of Mayor of Vancouver but declined to exchange the larger honor for that offered him in the Royal City.

● EUGENE R. HOFFMAN, lighting superintendent Seattle City Light, has been reappointed to a three-year term by Mayor Earl Millikin, with approval of the city council. Hoffman is a graduate of the University of Wisconsin school of engineering and has lived in Washington since 1894. Between 1913 and 1927, he was associated with the state highway department and from 1933 to 1937 was state director of PWA. He was assistant regional director of PWA for the Pacific Northwest in 1937 and 1938.

● G. A. PETERS, Chehalis, a commissioner of the Lewis County, Wash. PUD, has been named president of the Southwest Washington Utility District Assn. M. M. Moore, Ilwaco, is vice-president. The two men are also officers of the Washington PUD Commissioners Assn.

● GEORGE A. GILLESPIE, Stanford graduate and a native San Franciscan, has been named specialist for ultra-violet lamps sold under the trade mark "Sterilamp" for the Pacific Coast district of the Westinghouse Lamp division. Announcement of the appointment was made Dec. 15 by R. W. Murphy, district manager for the Lamp Division. Gillespie succeeds W. C. McHenry, who has resigned to enter private business in Los Angeles.

● ROBERT H. HEFFNER, Los Angeles publisher and past president of the Rotary Club, has been appointed to the Los Angeles Water and Power Commission by Mayor Fletcher Bowron.

● PEGGY BOYER, for the past seven years a member of the advertising department of Northwestern Electric Co., Portland, joined the staff of ELECTRICAL WEST as assistant editor, in January. Miss Boyer had been associate editor of *Northwestern Light*, the employee publication of Northwestern Electric, and of *Pacific Power & Light Co. Bulletin*, and prior to affiliation with these utilities had been managing editor and circulation manager of *Old Oregon*, the alumni magazine for University of Oregon at Eugene, of which she was a graduate. She also handled Girl Scout publicity in Portland as chairman of the public relations committee of the Portland Council.

## Mullendore Author of Food Administration History

William C. Mullendore, executive vice-president of the Southern California Edison Co., is author of the newly announced Hoover Library on War, Revolution and Peace Publication No. 18.—"A History of the United States Food Administration, 1917-1919." The book contains an introduction by Herbert Hoover and a bibliography by Ralph H. Lutz. The jacket explains that:

"Here is the record of that great organization through which the American people and food industries voluntarily cooperated to assure not only an adequate supply and distribution of food in this country but also feeding the Allies during the World War and all Europe after the Armistice. After the Armistice, William C. Mullendore, an important staff member of the United States Food Administration, prepared the official history of the Food Administration, completing it in 1921. As the appearance of a worldwide food problem now renders these records of special significance, the Hoover Library has decided to publish them without change in text."

The book is published by the Stanford University Press.

* * *

● E. W. SCHILLING, professor and head of the department of electrical engineering at Montana State College, Bozeman, has received the AIEE nomination for vice-president of the Northwest District. Officers and directors will be voted upon in the spring and will take office Aug. 1, 1942.

● ELWOOD TIERNEY, chief clerk, sales department of the Washington Water Power Co., Spokane, left that organization to join his father in the Tierney Electric Co., Seattle. The company is engaged on a number of defense contracts.

● W. C. MAINWARING, merchandising manager, B. C. Electric Railway Co., has been re-elected as first vice-president of the Building & Construction Industries Exchange at Vancouver, B. C.

## H. M. Ferguson, Utah Engineer, Dies

Hugh McKnight Ferguson, 60, research engineer for Utah Power & Light Co. and a member of that organization since 1916, died Feb. 7 of cerebral hemorrhage, following a six-week illness.

He was a past president of the Electrical League of Utah and a former official of the Rocky Mountain Electrical Cooperative League. He was a member of Salt Lake civic organizations and held membership in several professional societies.

Mr. Ferguson was born in Pittsburgh, Pa., and before coming west was employed by the Westinghouse Electric Co. in charge of construction of electrical generating stations, and was associated with the properties of Senator W. A. Clark of Montana. His first job with Utah Power & Light Co. was to direct installation and development of the company's steam heating system. He later was made manager of the Salt Lake division and was successively assistant commercial manager and research manager in the general office.

● S. B. PATTERSON, 62, district superintendent of stores, purchasing and transportation, San Joaquin Power division PG and E, died at Fresno on Feb. 14. He had been in poor health for about a year. A native of Salida, Calif., Mr. Patterson had been employed by the utility at Fresno for 33 years.

● EUGENE L. GIBNEY, electrical engineer, City Light, Seattle, died at his home in Seattle recently, at the age of forty-four. He became associated with City Light in 1921, and at the time of his death was principal engineer in charge of all engineering. Born in Butte, Mont., Mr. Gibney spent his youth in Seattle and was graduated from the University of Washington. He served at the Coast Artillery Officers' Training school at Fort Monroe, Va., during the First World War.

● JOSEPH D. GRANT, pioneer California industrialist and chairman of the board of the California Oregon Power Co., died in San Francisco Feb. 19 at the age of 83.

● S. W. SCARFE has been appointed manager of the General Electric Los Angeles Central Station Department, succeeding the late J. H. Cunningham. He had been assistant manager since September, 1941. Before coming to the Los Angeles office, Scarfe was resident agent in both Fresno and Sacramento and assistant to the manager in San Francisco.

● L. D. FOWLER will become Pacific district motor specialist for General Electric Co. on May 1. He is now in the aeronautical division of the Industrial Department of the Los Angeles office. His new headquarters will be in San Francisco.

● F. V. WRIGHT has been named general superintendent of California Electric Power Co., to succeed George M. Wills, who retired recently. Wright has been with the company for about 24 years and has been assistant general superintendent for more than 18 of them. His first job was as a foreman on the tower line and he was successively superintendent at Randsburg, engineer at Tonopah and traveling superintendent. He was appointed assistant superintendent in 1923.

● ROY BUTCHER, electrical contractor, San Jose, Calif., was reappointed by Governor Olson for the Contractors' License Board with a term ending Jan. 15, 1946. This will make the third term for electrical contractor Butcher, who has also been chairman of the board. He was one of the original appointees when the law was enacted.

● CHARLES KIRKPATRICK, heading the lighting equipment department at Graybar Electric Co., San Francisco, a retired Navy Annapolis graduate, was called back to active duty Feb. 7. In the Navy for seven years, and an Annapolis graduate, he was returned to be an instructor at the Naval Reserve Officers Training School at the University of California.

● A. A. BROWNE has resigned as assistant manager of the Pacific Coast district central station and transportation departments of Westinghouse Electric & Manufacturing Co., to become associated with the Moore Machinery Co. in San Francisco. W. R. Marshall, former Westinghouse vice-president in charge of Pacific Coast operations is also with the Moore organization.

● GEORGE M. GADSBY, president and general manager of Utah Power & Light Co., who had been serving as Utah coordinator of the contract distribution and priorities division, OPM, has been appointed Utah advisory committee chairman.

● ERIC A. JOHNSTON, president of Columbia Electric & Mfg. Co. and vice-president of the United States Chamber of Commerce, spoke before the Oakland, Calif., Chamber of Commerce on Feb. 3.

● FOSTER K. SAMPSON, illuminating engineer on the staff of Southern California Edison Co. Ltd., Los Angeles, has been placed in charge of a newly formed contract and record section established by that utility. This section is part of the commercial department and is designed to concentrate in one office the contracts between the company and its commercial, industrial and governmental consumers for uniformity and reference. Sampson, an architect as well as illuminating engineer, has been chairman of the Southern California Section, IES.

● O. J. BRAUN of the engineering department, Amalgamated Electric Co., Toronto, has been transferred to Vancouver, B. C., to join the staff of the Langley Electric Co. He will replace R. J. Helliwell, connected with Langley Electric at Vancouver for the past six years, who has been transferred to the Toronto headquarters of the Amalgamated Electric Co., parent organization.

● W. G. MURRIN, president British Columbia Power Corporation Ltd. and head of its subsidiary, the B. C. Electric Railway Co., has been awarded the Julian C. Smith Medal of the Engineering Institute of Canada for "Achievements in the Development of Canada."

● JACK LISIECKI, formerly with the Seattle Graybar organization and later with the Washington Toll Bridge Authority, recently joined the electrical engineering staff of Seims-Drake Puget Sound, with headquarters in Seattle.

● EARL B. STEARNS, formerly appliance field man for Westinghouse Electric & Mfg. Co., Seattle, has been transferred to the Westinghouse Electric Supply Co. as district lamp manager.

● W. H. PARK, Berkeley district manager of Pacific Gas and Electric Co., has been elected president of the Berkeley Chamber of Commerce for 1942.

● LOUIS KOTH, manager, Anaconda Wire & Cable Co. works at Orange, Calif., retired Jan. 1 and Edwin F. Gould was appointed manager to succeed him.

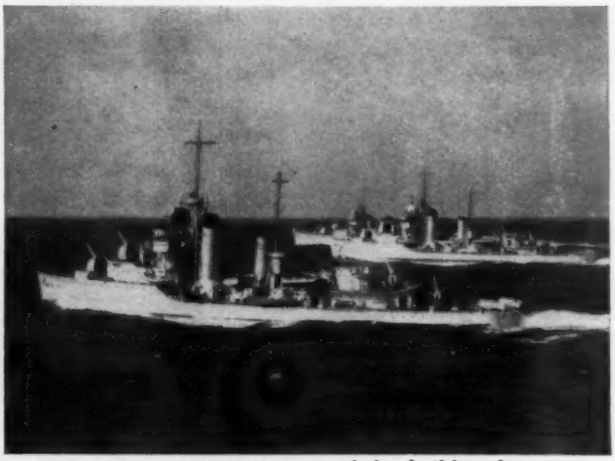
● C. H. LYNESS, electrical inspector for the city of Vancouver, Wash., resigned recently and B. F. Payne was appointed in his place.

● VAN S. MCKENNY, Seattle electrical contractor, recently became part owner of the *Seattle Daily Star*.

# WHAT *Better Light* CAN DO TO MAN-POWER!

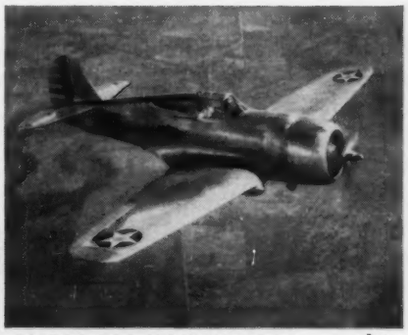
**Better light has increased production as much as 5 to 15% in many factories . . . if it could increase production by only 3% in vital war industries, it would be the equivalent of adding 300,000,000 man-hours a year to speed victory!**

**54,000,000 MAN-HOURS** *are required to build two battleships.*

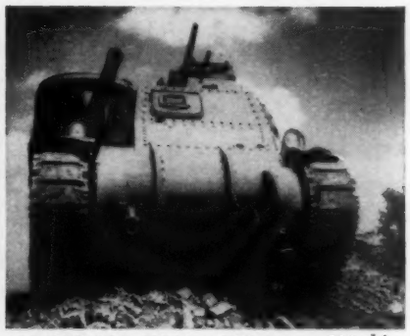


**30,000,000 MAN-HOURS** *are needed to build 10 destroyers.*

**31,250,000 MAN-HOURS** *go into building 250 big bombers.*



**12,500,000 MAN-HOURS** *are used to build 500 fighter planes.*



**28,000,000 MAN-HOURS** . . . *500 big tanks, 1000 medium, and 1500 light tanks.*

EVERYONE in the lighting industry knows that good light . . . lots of light . . . increases production and decreases errors without adding to floor space, hiring new men, or installing new machines. Recent reports show that better lighting has increased production in factories from 5 to 15%.

It is estimated that 1,000,000 of the 6,000,000 workers in vital industries already have modern lighting. If better lighting increased the production of the remaining 5,000,000 by only 3%, it would be the equivalent of adding 150,000 men. Assuming 2000 hours per year, better light could provide 300,000,000 *extra* man-hours annually.

To produce the number of ships, planes, and tanks indicated above would require approximately half of these 300,000,000 man-hours . . . *leaving the other half to produce food, ammunition, and supplies.*

Even today, thousands of businesses don't have modern man-hour saving light. These businesses need to be convinced of the importance of this modern production tool. That's the job cut out for the whole lighting industry to help win the war.

• • •

*To help you interpret the job that modern lighting can do in plants that need it most, General Electric has a booklet, "How Light Can Help" . . . telling this story in greater detail. A copy is yours for the asking. Write General Electric Company, Dept. 166-EW-C, Nela Park, Cleveland, Ohio.*

**G-E MAZDA *Fluorescent* LAMPS**

**GENERAL ELECTRIC**

## INDEX TO ADVERTISERS
### MARCH, 1942


Allis-Chalmers Mfg. Co. ..... 4, 5
Anaconda Wire & Cable Co. ..... 3

Briegel Method Tool Co. ..... 70
Burndy Engineering Co., Inc. ..... 22

California Oregon Power Co. ..... 54, 55
Chance Co., A. B. ..... 16
Connecticut Hard Rubber Co. ..... 12
Corning Glass Works ..... 21
Crocker First National Bank ..... 12

Driver-Harris Co. ..... 76

G. C. A. Mfg. Co. ..... 68
General Electric Co.,
Bridgeport ..... 32
Cleveland ..... 83
Schenectady ..... 1, 8, 9, 23
Graybar Electric Co., Inc. ..... 71

Helwig Company ..... 76
Honn Co., Geo. E. ..... 68
Hotpoint (Edison G-E Appliance Co., Inc.) Range ..... 24
Hubbard and Company ..... 13

Idaho Power Company ..... 54, 55
Ideal Commutator Dresser Co. ..... 67
Indiana Steel & Wire Co. ..... 67

Jeffries Transformer Co. ..... 14

Kearney Corp., James R. ..... 17, 18, 19, 20
Klein & Sons, Mathias ..... 12

Lang Mfg. Co., F. S. ..... 22
Lew Fittings Co. ..... 68
Line Material Company ..... 69
Lloyd Products Co. ..... 6

Marwood Limited ..... 66
Matthews Corp., W. N. ..... 7
Miller Company, The ..... 31

National Carbon Co., Inc. ..... 74
National Elec. Products Corp. ..... 28
National Tel. Supply Co. ..... 66

Okonite Company, The ..... 73
Okonite-Callender Cable Co., The ..... 73

Pacific Coast Elec'l Bureau ..... 4th Cover
Pacific Gas and Electric Co. ..... 3rd Cover
Penn-Union Elec. Corp. ..... 14
Portland General Elec. Co. ..... 54, 55
Puget Sound Power & Light Co. ..... 54, 55

Reliable Electric Co. ..... 16
Rocky Mountain Elec'l League ..... 54, 55
Roebling's Sons Co., John A. ..... 25

Shell Oil Company ..... 65
Sherman Mfg. Co., H. B. ..... 14
Smoot-Holman Co. ..... 22
Southern California Edison Co. Ltd. ..... 2nd Cover
Square D Company ..... 15

Thermador Elec'l Mfg. Co. ..... 68
Thomas & Sons Co., R. ..... 67
Tork Clock Co., Inc., The ..... 76
Treasury Department ..... 77

Union Carbide & Carbon Corp. ..... 74
Utah Power & Light Co. ..... 54, 55

Victor Insulators, Inc. ..... 11

Wagner Electric Corp. ..... 29
Ward Leonard Electric Co. ..... 70
Westinghouse Elec. & Mfg. Co.,
Cleveland ..... 26, 27
E. Pittsburgh ..... 10, 79, 80


# PROFILES *of the month*

Eric A. Johnston (left above) holds down the job of vice-president of the United States Chamber of Commerce, in addition to his duties as president of Columbia Electric & Mfg. Co., Spokane. He spoke recently before the Oakland, Calif. Chamber of Commerce. L. A. Williams (right above) was recently appointed executive assistant to Frank McLaughlin, president of Puget Sound Power & Light Co. He was advanced from Everett, Wash. district manager by the power company. George M. Wills (right center) retired as general superintendent of California Electric Power Co. following 30 years' service to the utility

Kenneth Connelly (right), F. R. Connelly Co., Seattle, with M. G. O'Hara, Norge vice-president, at the 1942 distributors meeting held in Detroit

# *Preview of coming campaigns by*

# P·G·and E·

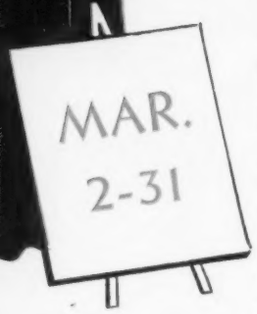
ELECTRIC APPLIANCE SOCIETY
OF NORTHERN CALIFORNIA

## MARCH

### Electric Water Heaters — Portable Lamps

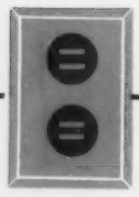
ELECTRIC WATER HEATERS—One newspaper advertisement plus two direct-mail pieces. A timely campaign designed for certain **rural** areas where we serve electricity only. Coincides with the government's wartime restrictions on electric line extensions by seeking to employ **existing** facilities to the fullest possible extent.

LAMPS AND LIGHTING—A continuation of our efforts to show how good lighting benefits eyesight, and what a cheery, inviting, morale-building atmosphere it creates in the home. This ad, incidentally, will offer free our new booklet on how to prepare for a blackout—and will appear in **all** our electric territory.




EW 103-342

**DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.**



The wave of a magician's wand and a murmur of "abacadabra" may produce wonders from an empty old hat. But it just won't produce copper wire and outlet boxes these days. To get our hands on them takes priority orders.

So it's up to all of us to make the most of what we have—to see that every foot of wire and every outlet installed counts most for now, and as much as possible for the future.

For after all, this war is just an emergency job—a job to be done as thoroughly and as quickly as possible. Then back to normal again—back to doing the things we prefer and living the life we like.

We all know that right now we can't sell our customers everything they'd like to buy. But we want to do the best we can for them. Let's see that they get a full penny's worth of service for every penny they spend in electricity.

SOUTHERN CALIFORNIA
ALL-WINTER
SUN FESTIVAL

# PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE RED SEAL STANDARD WIRING